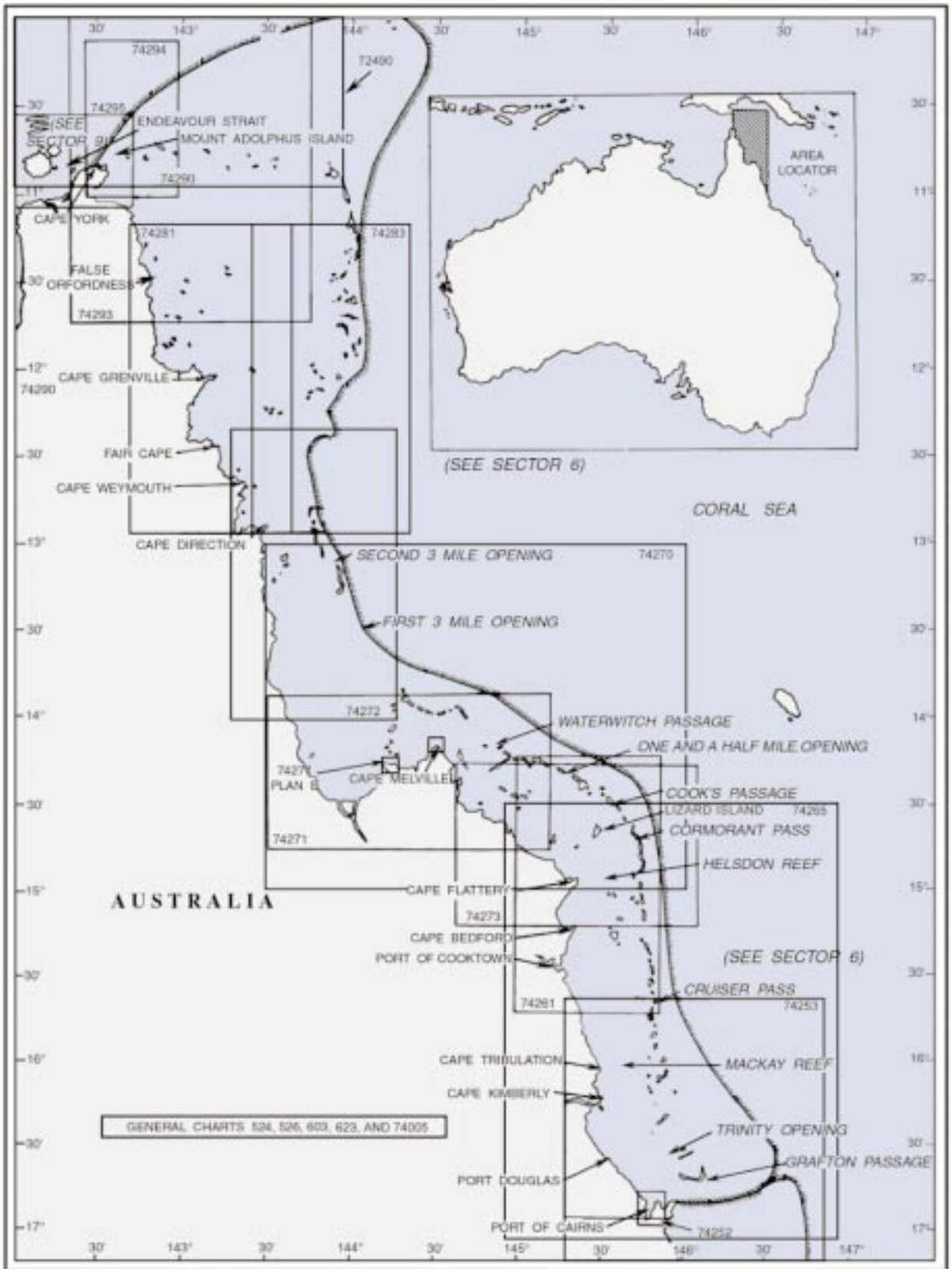

Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **8** — CHART INFORMATION

SECTOR 8

AUSTRALIA—CAPE GRAFTON TO CAPE YORK

Plan.—This sector describes the E coast of Australia from Cape Grafton NNW to Cape York. The dangers on the inner and outer edges of the Great Barrier Reef and the islets and dangers between them and the coast are described in the respective parts of the sector off which they lie. That part of the Inner Route that lies within the limits of this sector is also described, and the passes through the Great Barrier Reef N of Cape Grafton.

General Remarks

8.1 The coast trends about 183 miles NNW from Cape Grafton to Cape Melville, and consists of numerous small bights separated by prominent points and headlands. Although there are a number of short stretches of low coast, particularly between Cape Flattery and Cape Melville, most of the coast is high and rugged.

The coast recedes about 26 miles S between Cape Melville and Claremont Point, about 50 miles WNW, and then it trends somewhat irregularly NNW about 210 miles to Cape York. The numerous bights that indent this section of the coast are almost all separated by prominent headlands. Most of this coast consists of sandy beaches and low mangrove shores on which numerous creeks and minor rivers empty.

Most of the dangers fringing the coast are contained within the 10m curve which follows the coastal trend. From Cape Grafton to Cape Melville, this line lies from 0.3 to 9 mile offshore, and between Cape Melville and Cape York it lies between 0.3 mile and 6.2 miles offshore, except that it lies up to 13 miles seaward of the heads of some of the larger bays. Many steep-to islands and other dangers lie between the 10m curve and the inner edge of the barrier reef. The depth curves cannot be entirely relied on to give adequate warning of the dangers.

The inner edge of the Great Barrier Reef lies 3.5 to 26 miles offshore. Between Claremont Point and Cape Grenville, the inner edge of the reef lies 3.7 to 10 miles offshore, with many intervening dangers. Vessels proceeding along the coast should follow the recommended track as shown on the chart.

Winds—Weather.—During the summer months along the NE coast of Australia, S to the vicinity of Cooktown, the dominant wind is the Northwest Monsoon. It is sufficiently characteristic for the summer months to be termed the Northwest Season. South of the monsoons lies the belt of the Southeast Trades which are prominent as far S as Brisbane.

In winter, the monsoons have withdrawn and the region is dominated by the trade winds. The winds are steady and are occasionally of considerable strength, but as a rule are accompanied by fair weather.

The Coral Sea and the adjacent Australian coast comprise an area over which tropical cyclones are well known and often destructive. The height of the hurricane season is reached during the months of December through April.

Hurricanes affecting the coast normally approach from an E or NE direction and frequently reach the mainland between 15˚S and 20˚S, or from the Cape Flattery area S to Gloucester Head.

Hurricane damage may be caused in several ways. At sea the winds, often reaching 50 to 80 knots, with gusts appreciably higher, whip up mountainous waves. Along the coast, high winds and storm tides occasionally reaching 3.7 to 4.6m, lash vessels and pound and undermine shore installations. After the passage inland of a severe hurricane, violent floods, often resulting in loss of life, may be expected along rivers of the affected region. As a rule, the diameter of the destructive winds and seas is between 100 and 200 miles, although it is sometimes less.

Tides—Currents.—The currents between the coast and the Great Barrier Reef are a result of the prevailing seasonal winds. From April to November, the Southeast Trade Wind produces a current setting N and NW, following the general direction of the channels, at a rate of about 0.5 to 1.2 knots, depending on the strength of the wind. From December to March, the wind and the resulting currents are variable. The NW wind is more prevalent, particularly N of Cape Flattery, and tends to produce a current setting S at a rate of up to about 0.7 knot.

The tidal currents on that part of the coast contained within the limits of this sector set N during the rising tide and S during the falling tide, following the trend of channel between the coast and the barrier reef. They have a rate of about 0.5 to 0.7 knot, except in the entrances of some of the inlets, where they may be stronger.

The diurnal inequality of the tidal currents is relatively large. When the moon has large a N or S declination, the rate of the stronger tidal current of the day will be about 50 per cent more than the average and that of the weaker current correspondingly less.

The effect of the tidal current is to increase or decrease the prevailing wind-driven current. During the Southeast Trades, the tidal current is less than the wind-driven current, except in a few channels, and the resultant current sets N. During the NW wind, from December to March, the rate of the wind-driven current is less and the tidal current becomes more important.

Through the openings in the Great Barrier Reef, the flood currents set W and SW, and the ebb currents set E and NE. The rate of these currents is slight in the wider passages, but in the narrower ones they attain a rate of 2 to 3 knots at springs.

Pilotage.—Pilotage is compulsory for all vessels of 70m in length and longer. All loaded oil, chemical, and liquefied gas tankers are to carry a pilot when transiting the northern waters of the Great Barrier Reef. For more information, see paragraph 7.2 under the heading “Navigation in the Great Barrier Reef.”

Cape Grafton to Cape Tribulation

8.2 **Cape Grafton** (16˚52'S., 145˚55'E.) is the NW point of a bold headland that extends about 3 miles NE from the mainland; it is separated from the coastal hills by a low plain. The cape rises abruptly to a height of 375m about 1 mile SE.

Courtesy of the USS GERMANTOWN
Cape Grafton from N

There are two other peaks, one SSE of the above peak and the other SW. In clear weather the land around the cape may be identified at a distance by its appearance as three lofty islands.

The cape is clear of danger on its NE side; the 11m curve lies about 0.7 mile offshore, and the 20m curve lies about 1.5 miles offshore.

Caution.—Caution should be exercised by vessels from the N, particularly during hazy weather, in order that False Cape is not mistaken for Cape Grafton.

The coast between Cape Grafton and Cape Tribulation, about 54 miles NNW, forms a bight. Port Cairns lies at the S end of the bight between False Cape, about 4 miles W of Cape Grafton, and Ellie Point, about 4 miles farther N. From the latter point, the coast trends about 30 miles NNW to Island Point, then about 12 miles N to Cape Kimberly. Cape Tribulation lies 12 miles N of Cape Kimberly.

The coast between Cape Grafton and Cape Tribulation consists of sandy beaches separated by rocky points and fronted in some places by coral reefs and a few small islands. Many creeks and rivulets empty from this coast.

Most of the coast rises abruptly to coastal ranges, which are up to 783m high in the S part and up to 1,092m high in the N; the range lies parallel to the coast within about 1 mile inland. The coastal range is low SW of Cairns, in the vicinity of Island Point, and between Island Point and Cape Kimberly there is another low stretch. However, a range rises abruptly from the sea about halfway between the point and the cape.

The Great Barrier Reef—Inner Edge—Green Island to Mackay Reef

8.3 The inner edge of the Great Barrier Reef trends about 47 miles NNW from Green Island, 6.7 miles NNE of Cape Grafton, to a position 6.5 miles SE of the Low Islets and then about 23 miles N to Mackay Reef. Vessels should keep SW and W of a line connecting the following reefs which mark the edge of the inner edge of the Great Barrier Reef. These dangers are steep-to on their W sides with depths of 18.3m close off them.

Upolu Cay (16˚40'S., 145˚56'E.), 2.4m high, lies on the NW edge of Arlington Reef, 11.5 miles N of Cape Grafton.

Oyster Reef, about 1.7 miles long, lies 1.5 miles N of Upolu Cay. Detached heads lie up to 1.2 miles W of the main body of the reef; the reef dries on its E side.

Trinity Opening lies with its inner entrance between Oyster Reef and Batt Reef, about 11 miles NW.

Pixie Reef, a small drying pinnacle, lies in the middle of the inner entrance of Trinity Opening, 6 miles NW of Oyster Reef.

Batt Reef, about 10 miles long, uncovers at half tide; it has many large boulders on its SW side.

Satellite Reef (16˚26'S., 145˚41'E.), with a least depth of 2.7m, lies 2 miles off the W side of Batt Reef and 6.2 miles SE of the Low Islets.

Caution.—Caution should be exercised in the vicinity of Satellite Reef because of the current that frequently sets offshore from the coast toward Trinity Opening when the NW winds prevail or during the rainy season.

8.4 Tongue Reef, an extensive partly drying reef, lies with its W extremity 6 miles NNW of Batt Reef. A depth of 6.7m is charted 3.5 miles NW of the N extremity of Batt Reef.

Rudder Reef is separated from Tongue Reef by a channel 3 miles wide. Foul ground, with a depth of 3m, lies 2.5 miles off the W side of Rudder Reef.

Pratt Rock (16˚09'S., 145˚37'E.), with a least depth of 3.7m, lies 4 miles NNW of the SW extremity of Rudder Reef.

Undine Reef lies 2 miles NNE of Pratt Rock. A detached patch, with a depth of 8.5m, lies 1 mile NNW of the W end of Undine Reef.

Mackay Reef (16˚03'S., 145˚39'E.), which dries, lies 3.7 miles N of the sand cay on Undine Reef. A sand cay, 1.2m high, is located near the W end of the reef. Foul ground extends 1.2 miles S and 0.7 mile N from the reef.

The Great Barrier Reef—Outer Edge—Euston Reef to Anderson Reef

8.5 The outer edge of the Great Barrier Reef, between Grafton Passage and Trinity Opening, 24 miles NW, consists of a broken and irregular barrier. Detached reefs and irregular depths lie outside the general direction of its length. The same formation continues for a distance of about 14 miles farther N.

Off Crispin Reef, 18 miles NNW of Trinity Opening, the outer edge of the Great Barrier Reef assumes a uniform and well-defined character and continues N 18 miles to Anderson Reef.

Grafton Passage

8.6 **Grafton Passage** (16˚40'S., 146˚12'E.), a clear and straight passage about 5 miles wide, lies with its seaward entrance between the NW extremity of Euston Reef and the SE side of Fin Reef, about 6.5 miles NW. It is the best and most used passage from New Guinea. The passage is well marked by a series of lights and radar landfall.

Grafton Passage extends in a general SW direction for a distance of 20 miles and joins the recommended track of the Inner Route in a position about 1.2 miles NE of Fitzroy Island.

8.7 Dangers on the SE side.—Euston Reef (16˚41'S., 146˚15'E.), a small reef on which the sea always breaks, lies 22 miles NE of Cape Grafton. A light, equipped with racon, is situated on the reef.

Thetford Reef lies about 7.5 miles SSW of Euston Reef; the S part dries 2.4m, and the N side is foul to a distance of 1.2 miles. This reef forms the SE side of the inner entrance of Grafton Passage.

8.8 Dangers on the NW side.—Fin Reef (16˚36'S., 146˚10'E.), a small patch with a least depth of 5.5m, lies 6.5 miles NW of Euston Reef. In 1968, depths of 6.1 to 9.1m were reported about 12.5 miles NE of Fin Reef.

Arlington Reef, an extensive reef which uncovers at half tide, lies with its N extremity 3.5 miles SW of Fin Reef. This reef is steep-to on its E and S sides.

Green Island (16˚46'S., 145˚58'E.) is a wooded islet, 20m high, located 3 miles SW of the SW side of Arlington Reef and 7 miles NNE of Cape Grafton.

Tides—Currents.—Currents setting SSE at a rate of 4.5 knots have been observed off the seaward end of Grafton Passage.

Vessels transiting Grafton Passage, should refer to the chart.

From seaward in hazy weather it is better to keep slightly to the S side of the channel, as the reefs in that direction are more easily seen, and the changes in depths are less abrupt.

Pilotage.—See paragraph 9.4 for pilotage information.

Caution.—A reef has been reported to exist in the vicinity of the pilot boarding ground. Vessels are urged to exercise caution when in the vicinity, and to contact local authorities for further information.

8.9 Hope Reef (16˚32'S., 146˚08'E.), with a least depth of 4.1m, lies about 5 miles NNW of Fin Reef. It is one of several small reefs and shoal patches which lie on the outer edge of the Great Barrier Reef between the seaward entrances of Grafton Passage and Trinity Opening.

Nicholas Reef, a small patch with a depth of less than 1.8m, lies 2 miles NW of Hope Reef. Depths of 12.8 to 19.5m extend 0.8 mile SW from the reef.

Onyx Reef, small in area and with a least depth of 2.9m, lies about 3.5 miles NNW of Nicholas Reef. A 12m patch lies 1 mile NE of Onyx Reef.

Spur Reef (16˚24'S., 146˚03'E.), located about 2 miles NW of Onyx Reef, forms the SE side of the seaward entrance of Trinity Opening. The reef has a least depth of 1.8m.

The Great Barrier Reef—Inner Edge—North War-den Reef to Iris Reef

8.10 Trinity Opening is a wide, deep channel, but it has not been closely examined; it lies between the N side of Spur Reef and the E side of Tongue Reef, 7.5 miles NW. The opening trends SW for a distance of about 20 miles.

8.11 Dangers on the SE side.—Norman Reef (16˚25'S., 146˚00'E.), which dries, lies 2.5 miles WSW of Spur Reef. A beacon is situated on the N side of the reef. Foul ground lies between the two reefs. Saxon Reef, a small drying reef, lies 1.2 miles SSW of Norman Reef.

Hastings Reef, which dries in places, lies with its N extremity 2.7 miles SSE of Saxon Reef. A shoal, with a depth of 0.2m, lies 2 miles WSW of its SW extremity.

Michaelmas Reef dries 0.9 to 1.2m and lies with its NE extremity 2 miles SE of Hastings Reef. A cay, 2.4m high and covered with vegetation, lies near the SW extremity of the reef. Foul ground fringes the NW side of the reef to a distance of 1.7 miles NW.

Oyster Reef lies 1.7 miles SW of Michaelmas Reef; it forms the SE side of the inner entrance of Trinity Opening.

8.12 Dangers on the NW side.—Linden Bank (16˚18'S., 146˚00'E.), with a depth of 11m, restricts the channel entrance about 6 miles N of the beacon on Norman Reef. Tongue Reef, a large reef, of which only the seaward side has been surveyed, lies on the NW side of Trinity Opening. There are many large boulders on the SE side of the reef; this side of the reef is steep-to.

Batt Reef, whose SE side dries from 0.9 to 1.2m, is separated from the S extremity of Tongue Reef by a partially-surveyed channel about 1 mile wide.

General depths of 33 to 69m are found in the fairway, which is clear of dangers and passes between Pixie and Batt Reefs. The channel between Pixie and Oyster Reefs is also clear of dangers and has depths of 24 to 40m.

There are two submarine cables laid through Trinity Opening.

Tidal currents attain a rate of 0.5 knot on the springs between Saxon and Batt Reefs. The flood sets SW; the ebb sets NE.

From seaward, care should be taken to approach Trinity Opening from outside the 200m curve on the parallel of 16˚20'S, then steer a mid-channel course as required.

Opal Reef (16˚14'S., 145˚53'E.), which dries, lies 7 miles NW of Linden Bank. A large boulder lies on the N part of the reef. A beacon stands in the middle of a reef which lies 0.5 mile N of Opal Reef.

St. Crispin Reef, Agincourt Reef, and Escape Reef extend in a N direction along the seaward edge of the barrier reef from a position 4 miles NNW of the boulder on Opal Reef. These three reefs are separated from the reefs forming the inner edge of the barrier reef by an extensive area of unsurveyed water reported to be full of coral reefs.

Anderson Reef (15˚47'S., 145˚48'E.) lies 1 mile N of Escape Reef. Shoals, with a least depth of 2.7m, fringe the NW side of the reef. A detached 3.7m patch lies 1.7 miles SW of the reef, and a small reef lies 0.5 mile S of the detached patch.

Cape Grafton to Buchan Point

8.13 False Cape (16˚52'S., 145˚51'E.) lies 4 miles W of Cape Grafton and rises abruptly to a height of 335m less than 1 mile S. A range of mountains trend S from the point. Mission Bay, which is shallow, indents the coast 2.5 miles S between the two capes. An island, 42m high, lies 1.7 miles SW of Cape Grafton, on the N side of drying sand and mud flats.

Spoil grounds are situated 1.7 miles NE and 4.7 miles NNW, respectively, from False Cape.

Ellie Point lies about 4 miles W of False Cape, and Taylor Point lies 7.5 miles NW of Ellie Point. Taylor Point, a steep, rocky point, marks the N limit of the Port of Cairns.

From Taylor Point, the coast trends 2.7 miles NNW to Buchan Point. A small bight is formed on the W side of Taylor Point.

Buchan Point (16˚44'S., 145˚40'E.) is a rocky point about 20m high and rises quickly to Mount Buchan, 671m high, 1.2 miles W.

Double Island, 0.7 mile NE of Buchan Point, rises to a height of 82m on its W and 79m at its E end. Haycock Islet, 34m high, lies 0.5 mile SE of Double Island.

Cairns (16˚56'S., 145˚47'E.)

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8.14 The main part of the port of Cairns lies in the narrow entrance of Trinity Inlet, which is located at the S end of a shallow bay that indents the coast about 3 miles S between False Cape and Ellie Point. The city of Cairns and the berthing facilities lie on the W side of the entrance to Trinity Inlet. The port of Cairns includes all the navigable waters contained within a line from Cape Grafton to a position about 2 miles N and then WNW to Taylor Point.

Cairns Port Authority

http://www.cairnsport.com.au

Winds—Weather.—The winds at Cairns are predominantly from the S throughout the year. As a result, the Murray Prior Range, S of the city, acts as a wind shed with cumulus clouds almost always apparent at the top of these mountains. These rain clouds, which bring heavy rains along the higher slopes, seldom reach across Cairns Harbor unless S or SE winds attain velocities of 15 to 20 knots.

During the rainy season, Cairns is situated within the region frequented by the equatorial front and experiences conditions of low clouds, occasional poor visibility, and intermittent light rain. In the rainy season, when an equatorial front has been established, such weather usually persists for periods of 2 or 3 days or until S winds reach sufficient force to cause a N displacement.

During the dry season, low pressure areas moving across the continent to the S are too weak to have any appreciable effect at Cairns. In anticyclonic conditions, if a high passes to the N, the sky remains clear for several days with only a few fair weather cumulus clouds forming in the afternoon and dissipating at night. The daily range of temperature is greater, and haze accumulates with light to variable winds. When a high pressure area passes to the S, it brings a strong SE flow of moist air from the ocean. This condition may prevail for days at a time and is the cause of winter rains in this area. Fogs are rare and those that occur are usually associated with rain.

Tides—Currents.—The tides are influenced by the wind; springs rise from 1.8 to 2.9m, and neaps from 1.2 to 2.1m.

The tidal currents change at the time of HW and LW and, at springs, may attain a velocity of 2 knots. The flood current sweeps around False Cape and sets W across the channel toward Ellie Point, then it gradually turns S into the line of the channel. The ebb current sets in the opposite direction, as described above.

A 5 to 6 knot ebb current is encountered in the harbor during the wet season and, after heavy rains, the flood water from the Barron River, close N of Ellie Point, sets strongly E toward False Cape.

Depths—Limitations.—The approach channel, which had a depth of 8.3m in 2003, leads from seaward to the harbor facilities at Trinity Inlet. It is well marked by leading lights. The channel is extremely narrow at 90m of navigable width for approximately 7nm in length. Twelve berths for the handling of a variety of cargo are available to ocean-going vessels.

The main wharf is a continuous quay, 595m in length, providing berths for vessels in excess of 200m loa. Berthing information can be seen in the accompanying table.

The Royal Australian Naval Berth is situated just S of Berth 10, the tanker berth.

Smith Creek Wharf No. 1, with an alongside depth of 5.5m, handles general cargo and seafood. The berth can handle vessels up to 65m in length.

There are two barge ramps situated about 1 mile upstream in Smiths Creek. Both ramps accommodate vessels up to 55m in length, with a maximum beam of 13.2m.

Cairns Port Facilities (2003)

Berth	Depth	Max. Length	Remarks
1	8.7m	200m	Passenger.
2	8.4m	200m	Passenger.
3	8.4m	200m	Passenger and general cargo.
4	8.4m	200m	General cargo and dry bulk.
5	8.4m	200m	General cargo and dry bulk.
6	7.0 to 8.4m	138m	Containers and ro-ro.
7	10.0m	250m	General cargo and bulk fertilizer
8	9.6m	250m	General cargo and bulk fertilizer.
10	8.8m	203m	Tankers.
12	10.2m	183m	Bulk sugar and molasses

Notes.
1. Berths 1-5—Nominal lengths of 91.5m.
2. Berth 1-3—May be used in conjunction for longer vessels.
3. Berth 12—Maximum beam of 24.5m.

Aspect.—False Cape and Cape Grafton are prominent in the approach to Cairns Harbor. Mount Sheridan, 633m high, and Mount Whitfield, 381m high, lie 5 miles SW and 2.7 miles WSW, respectively, from Ellie Point. Red Peak, 611m high, lies 6 miles WNW of Ellie Point. Saddle Hill, 652m high, lies 2 miles N of Red Peak.

Courtesy of the USS GERMANTOWN

Cairns—Entrance Channel

Courtesy of the USS GERMANTOWN

Cairns—Tanker Wharf

Courtesy of the USS GERMANTOWN

Cairns—Berth 7 and Berth 8

Courtesy of the USS GERMANTOWN

Cairns—Berth 1 to Berth 6

Cairns has been reported to give good radar returns up to 10 miles.

Pilotage.—Pilotage is compulsory for vessels 35m or greater in length and is available 24 hours. Pilotage should be requested at least 48 hours in advance. Pilots will contact the vessel 30 to 45 minutes prior to the designated boarding time.

Pilots board about 1.7 miles NNE of Entrance Lighted Beacon C1 and Entrance Lighted Beacon C2. Large deep-draft vessels may be required to be boarded further out, on the range line of the Entrance Lighted Beacons, about 4.3 miles NE of these beacons.

The pilot vessel is fitted with VHF.

Regulations.—The quarantine line for the port is drawn through the seaward beacons of the entrance channel. Vessels are boarded seaward of this line.

Explosives are discharged at Berth 1 through Berth 8.

There is a speed limit of 10 knots in the entrance channel, 8 knots in Trinity Inlet, and 4 knots in Smiths Creek.

Arriving vessels should contact Cairns Harbor on VHF channel 16 to advise of final ETA. All vessels transiting the port must maintain a radio watch on VHF channel 16. All vessels greater than 35m long should notify Cairns Harbor on VHF channel 16 prior to departing or shifting berths.

Anchorage.—There are no prescribed anchorages for Cairns. Vessel requiring anchorage must do so outside the quarantine designation line. Anchorage may be taken about 1 mile NE of the outer pair of lighted beacons, off the entrance channel, in 11m, mud.

Buchan Point to Cape Tribulation

8.15 From Buchan Point, the coast trends in a NW direction 20 miles to Island Point. In general, the range of coastal mountains follow the trend of the coast. Most of the coast consists of sandy beaches with intervening rocky points. Except for Egmont Reef, the dangers along this coast are contained within the 10m curve.

White Cliff Point (16˚39'S., 145˚34'E.), 25m high, lies 8 miles NW of Buchan Point. The cliffs that form the point are particularly conspicuous during the early part of the day.

Unity Reef, parts of which are awash, extend 1 mile ESE from the coast, 1 mile S of White Cliff Point.

Mount Harris, 1,080m high, lies on the coastal range 4.5 miles W of White Cliff Point; it has been reported to give good radar returns.

Yule Point (16˚35'S., 145˚31'E.), 5.2 miles NW of White Cliff Point, rises abruptly to a hill, 102m high. Reefs, which dry in parts, fringe the coast to 0.7 mile offshore, between the S side of Yule Point and a position 4.5 miles NW. Korea Reef, which partly dries, lies just inside the 10m curve, 2.5 miles NE of Yule Point.

Egmont Reef (16˚31'S., 145˚32'E.), a small steep-to reef which dries, lies just outside the 10m curve, 1.5 miles NNW of Korea Reef.

The Mowbray River enters the sea about 2 miles NW of Yule Point. Mangroves fringe the coast in the vicinity of the river. A drying bar and reefs encumber the river and its approach, but small craft with local knowledge can enter it.

Island Point (16˚29'S., 145˚28'E.), 4 miles NNW of the Mowbray River, lies at the N end of a low, sandy, and mangrove-covered promontory. It rises to a height of 74m, 0.3 mile SSE of its N extremity. From seaward, the point appears as an island.

Morey Reef, which dries, lies 0.3 mile NW of Island Point, on the W side of the entrance range to Port Douglas.

Port Douglas lies in the entrance to Dickson Inlet, on the W side of Island Point. The port is available to small craft.

Pilotage is compulsory for all foreign vessels 35m long and over, and is available 24 hours. Pilots are ordered through Cairns; see paragraph 8.14 for further requirements. Pilots will contact the vessel about 30 minutes prior to boarding time and board on the range line about 0.4 mile NE of Entrance Lighted Buoys. Vessels approaching and transiting the harbor should maintain a listening watch on VHF channel 16.

Anchorage may be taken in 7 to 9m, mud, 0.5 mile N of Island Point.

8.16 Between Island Point and Cape Kimberley, 12 miles N, the coast forms a bight that recedes about 4 miles; between Cape Kimberley and Cape Tribulation, 12 miles farther N, a similar bight is formed.

The 10m curve trends N from a position 1.7 miles NE of Island Point to a position close off Cape Kimberley. Most of the dangers lie within the 10m curve.

From Island Point to **Dayman Point** (16˚23'S., 145˚25'E.), 6 miles NNW, the land is low, and several creeks empty into the sea. A conspicuous water tower stands on the coast 2.2 miles S of Dayman Point.

The Daintree River empties into the sea 6 miles NNE. An extensive bar, with a depth of 0.9m, encumbers the river mouth and extends about 0.5 mile offshore.

The coast between the entrance to the Daintree River and Cape Kimberley, a bold and steep promontory, 1.7 miles ENE, is formed by a sandy beach fronted by below-water rocks, and backed by low land covered with bush.

Off-lying islands.—The **Low Islets** (16˚23'S., 145˚34'E.) lie 8.5 miles E of Dayman Point. The two islets are located on a steep-to drying reef about 1 mile long. A light and a signal station are situated here. The islets have been reported to give good radar returns up to 14 miles.

Anchorage.—Vessels may take anchorage, in 12.8 to 14.6m, mud, good holding ground, 0.5 mile NNW of the Low Islets.

Snapper Island lies 1 mile SSE of Cape Kimberley, just inside the 20m curve. The island rises to a height of 115m in the W part. A narrow reef fringes the island in places, and depths of less than 10m extend 1.2 miles N from it.

Anchorage.—Anchorage may be obtained off the NW end of Snapper Island during SE winds, but the swell sets around the island making it uncomfortable. With NE or SW winds there is good anchorage in the lee of the island.

8.17 From **Cape Kimberley** (16˚17'S., 145˚29'E.) to Cape Tribulation, the coast consists primarily of sandy beaches separated by rocky points. The coastal range backs this part of the coast, and several hills rise abruptly from the sea. Thornton Peak, 1,374m high, lies 9 miles NW of Cape Kimberley; it has been reported to give good radar returns.

The dangers fringing the coast between Cape Kimberley and Cape Tribulation lie within the 5m curve which follows the coastal trend up to about 0.7 mile offshore. The 10m curve follows the coastal trend from less than 0.5 mile to almost 2 miles offshore.

Black Rock, 1.5m high, lies 0.4 mile offshore, 2 miles N of Cape Kimberley.

Bailay Point, 4.2 miles NNW of Cape Kimberley, is the S entrance point of Alexandra Bay. Bailay Hill, 293m high, rises about 0.5 mile W of the point.

Alexandra Bay occupies the S part of a bight that indents the coast about 1 mile W, between Bailay Point and a position on the coast 5 miles N. The bay is shallow and affords no shelter.

Cape Tribulation (16˚05'S., 145˚29'E.) is a grassy hill, 102m high, 8 miles N of Bailay Point; it juts out from a bold headland and is steep-to.

Caution.—There is a two-way route shown on the chart between Cape Kimberley and Cape Flattery. The route is not mandatory and is not a traffic separation scheme; it indicates the best route for vessels up to 9m having regard to the charted depth and dangers. For more information, see paragraph 7.2 under the heading “Navigation in the Great Barrier Reef.”

Cape Tribulation to Cape Flattery

8.18 The coast between Cape Tribulation and Cape Flattery, about 67 miles N, consist of a series of bights that recede up to 6 miles W. Most of the coast consists of sandy beaches separated by rocky points, and in places is fronted by reefs. The coast is bold and precipitous in several places.

Several coastal ranges rise abruptly from the coast between Cape Tribulation and Archer Point, but there is a low 4.5 mile stretch of coast about 12 miles NNW of Cape Tribulation. Between Archer Point and Cooktown Harbor, 9 miles farther N, the coast is low, however, a peak rises to a height of 429m, about 1 mile S of Cooktown Harbor. From the low land immediately N of Cooktown Harbor, a range of high hills rises abruptly from the sea; between Cape Bedford and Cape Flattery, this range of hills is lower.

A number of reefs and islets lie between the coast and the inner edge of the Great Barrier Reef, which lies from 5.5 to 10 miles off this part of the coast.

Many of the steep-to islets and dangers off this coast are contained within the 20m curve, which irregularly follows the coastal trend between 0.5 mile and 8 miles offshore. Some parts of the inner edge of the Great Barrier Reef lie only about 2 miles outside the 20m curve.

The Great Barrier Reef—Inner Edge—Mackay Reef to Heldson Reef

8.19 The inner edge of the Great Barrier Reef trends about 27 miles NNW from Mackay Reef to Bee Reef, and then about 40 miles N to Helsdon Reef, which lies about 7.5 miles E of Cape Flattery. Vessels should keep W of a line connecting the following reefs, which are the dangers marking the inner edge of the Great Barrier Reef. These dangers are steep-to on their W sides, with depths of over 20m close off them.

Spitfire Reefs (16˚01'S., 145˚38'E.), several detached reefs with a least depth of 1.1m, lie with the W reef 2.5 miles NW of the sand cay on Mackay Reef. Bonner Rock, with a depth of 5.6m, lies 1.7 miles N of Spitfire Reef.

Pickersgill Reef, about 3 miles long, lies 5 miles NNW of Bonner Rock; a sand cay is located on the NW extremity of the reef. A light stands on the NW extremity of the reef.

Papuan Pass and Cruiser Pass lie with their W entrances between Pickersgill Reef and Cairns Reef.

Endeavour Reef (15˚47'S., 145˚35'E.), in the middle of the W entrances of Papuan Pass and Cruiser Pass, lies with its W end 4 miles N of the W extremity of Pickersgill Reef.

Cairns Reef, a large coral reef shaped like a horseshoe, lies 2.5 miles N of the W extremity of Endeavour Reef. There are boulders on its S and SW sides, which dry 1.5 to 2.4m. Malcolm Patch, with a depth of 8.2m, lies 0.7 mile N of the NW extremity of Cairns Reef.

Bee Reef (15˚38'S., 145˚26'E.), which dries, lies about 0.7 mile W of the NW extremity of Cairns Reef, and about 6 miles SE of the light on Archer Point. The reef is steep-to except for shoal water off the N and S ends.

Egret Reef lies 8.5 miles N of Bee Reef; it is a partly drying reef that is always visible because of discoloration or ripples. This reef is steep-to, except for a number of coral patches that lie within 0.5 mile of its NW side. There is a 4.3m patch which lies close off its S side. A lighted beacon stands on the middle of the W side of the reef.

Boulder Reef is a steep-to reef lying 1.5 mile N of Egret Reef. The reef has some large black boulders on its E and SE side and is always visible.

Anchorage.—Good anchorage may be taken, in 24m, mud, sand, and shells, about 0.5 mile NW of Boulder Reef.

Lark Reef, 7.2 miles NNE of Boulder Reef, is dangerous, as it can only be seen in good weather at LW, when part of its SW side dries. Several coral heads which lie off the W edge of the reef are not visible until close to.

Lark Pass lies with its W entrance between Lark Reef and Swinger Reef.

8.20 **Swinger Reef** (15˚15'S., 145˚32'E.), which dries, lies 1.2 miles NNE of Lark Reef. A detached 3.7m patch lies about 0.5 mile W of the NW end of the reef.

Startle Reefs, which are difficult to see, lie with their W extremity about 3 miles NW of Swinger Reef.

Forrester Reef (15˚10'S., 145˚30'E.), 1 mile NW of Startle Reefs, is always visible and is steep-to except on its N side, where there are several detached heads.

Anchorage.—Anchorage may be obtained, in a depth of 27m, mud and sand, in the lee of Forrester Reef, 0.5 mile offshore.

Strickland Reef lies about 5 miles NNE of Forrester Reef; the reef does not show up well when submerged.

Pasco Reef, which has a patch of sand that uncovers 0.6m, lies 1.2 miles NNE of Strickland Reef. Tilbrook Bank, a 14.6m patch, lies 2.2 miles NNW of Pasco Reef.

Helsdon Reef (14˚57'S., 145˚29'E.), a well-defined reef which dries in patches around its edge, lies 3 miles NNW of Tilbrook Bank and 7.5 miles E of Cape Flattery. A depth of 8.2m lies 4.5 miles NW of Helsdon Reef.

The Great Barrier Reef—Outer Edge—Anderson Reef to Ribbon Reef

8.21 From Anderson Reef, the outer edge of the Great Barrier Reef extends in a N direction about 51 miles to the S end of **Ribbon Reef** (14˚56'S., 145˚42'E.). Ribbon Reef is 16 miles long and about 0.7 mile wide. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

There are a great number of unnamed reefs in this area. The reef has not been completely examined and adequate soundings are lacking.

Papuan Pass (15˚46'S., 145˚49'E.) is entered between Anderson Reef, on the S, and Ruby Reef, 1.5 miles NW. The navigable channel between the reefs is about 1 mile wide and has depths of 24 to 48m. From the pass the deep-water channel extends in a general W direction for a distance of about 20 miles to a position some 5 miles ESE of Rattlesnake Point, at a junction point with the recommended track of the Inner Route.

The dangers in Papuan Pass, in addition to Anderson Reef, are Ruby Reef, to the N of the seaward entrance, and Pickersgill Reef and Endeavour Reef on the S and N side, respectively, of the inner entrance.

Ruby Reef is 1 to 2 miles wide and extends about 2.7 miles NNE from its S extremity. The S and E sides of the reef are steep-to, but the W side is foul to a distance of 1.5 miles W.

Pickersgill Reef, previously described in paragraph 8.19, lies with its E extremity 12 miles WSW of the SW extremity of Anderson Reef; from its E extremity it extends 3 miles WNW.

Endeavour Reef lies with its S extremity 4 miles N of Pickersgill Reef and 8.5 miles W of the E extremity of Ruby Reef. A fringe of sunken coral encloses the reef, and at its E extremity; foul ground extends up to 1 mile from it.

The flood current sets WSW and the ebb current sets ENE. The rate at springs is 1 knot.

Vessels may enter Papuan Pass midway between Anderson Reef. and Ruby Reef. Steer to pass midway between Pickersgill Reef and Endeavour Reef, and join the Inner Route farther W.

8.22 **Pearl Reef** (15˚43'S., 145˚48'E.), which is foul, lies close N of Ruby Reef.

Cruiser Pass is entered between Ruby Reef and Lena Reef, which dries, 3 miles N. Lena Reef is steep-to, with the 200m curve less than 0.5 mile from it.

From its seaward entrance, Cruiser Pass trends in a general WSW direction for about 24 miles to its intersection with the Inner Route, SW of the Hope Islands. The fairway passes between the W extremity of Endeavour Reef and the S extremity of Cairns Reef, 2.5 miles N. The fairway has general depths of 20 to 55m.

Irene Reef (15˚39'S., 145˚43'E.), a danger on the N side of Cruiser Pass, lies 4.5 miles W of Lena Reef. The S side of the reef is foul to a distance of 0.5 mile off. The E extremity of Cairns Reef lies 8 miles WSW of Irene Reef.

Vessels approaching Cruiser Pass from seaward should pass in mid-channel between Pearl and Lena Reefs, and then steer to pass midway between Endeavou Reef and Cairns Reef, to a position 2.2 miles SW of the Hope Islands.

The reefs from Lena Reef extend about 30 miles N to a reef on the S side of the entrance to Lark Pass. They are a series of drying reefs lying from 20 to 30 miles off the coast. The 200m curve has not been delineated and the waters inside the reefs are unsurveyed.

Lark Pass is entered between the N end of a drying reef in position 15˚08'S, 145˚44'E, and a similar reef 1.2 miles NNW.

Harrier Reef (15˚08'S., 145˚42'E.), with a sand cay on it, lies 1.5 miles W of the S entrance point of Lark Pass. A 4.6m coral head lies 0.5 mile SE of the reef.

Marx Reef, which dries, lies on the N side of Lark Pass, 5 miles SW of Harrier Reef.

A steep-to drying reef lies 1 mile WSW of Marx Reef, with a 3m patch between them.

Startle Reefs lie 2.7 miles W of the drying reef WSW of Marx Reef. They lie on the N side of Lark Pass at its SW end.

Pullen Reefs (15˚15'S., 145˚35'E.), which dry, lie on the S side of the fairway, 3.2 miles SSW of Marx Reef.

8.23 Swinger Reef lies on the middle of the SW entrance of Lark Pass. Foul ground extends 1 mile E from Swinger Reef; a 4.6m patch lies 0.5 mile farther E.

Caution.—Mariners are cautioned that the reefs in Lark Pass are difficult to make out at HW when the sea is smooth. Several vessels have grounded on the N side of Lark Reef where the below-water edge is difficult to see. Swinger Reef is nearly always visible.

Vessels entering Lark Pass should steer a mid-channel course through the entrance, then steer a course to the SW to pass SE of the 4.6m patch of the SE side of Harrier Reef, then pass between Marx Reef and Pullen Reef on the S. Care must be taken to clear the 4.6m patch E of Swinger Reef. When S of Swinger Reef, steer for South Cape Bedford on a course of 264˚. Continue on 264˚ until reaching the Inner Route, then steer N or S as required.

The outer edge of the Great Barrier Reef continues in a general N direction from Lark Pass for 11.5 miles to the S extremity of Ribbon Reef. There are openings between the reefs, but none of them have been examined.

Cape Tribulation to Archer Point

8.24 From Cape Tribulation to the S entrance of Weary Bay, about 9 miles NNW, the coast trends in that direction and consists mostly of a series of sandy beaches separated by rocky points.

Donovan Point (16˚01'S., 145˚27'E.), with a rock 3m high close off, lies 4 miles NNW of Cape Tribulation. Mount Owen, 914m high, lies 6.2 miles W of Donovan Point.

Cowie Point, bold and cliffy, lies about 2.5 miles NNW of Donovan Point. From Cowie Point the coast trends about 2.5 miles NW to the S entrance point of Weary Bay. A dangerous wreck lies 1.5 miles due N of Cowie Point.

Weary Bay indents the coast about 2 miles and extends 6 miles from its S entrance point to Rattlesnake Point at its N end. Foul ground extends about 0.9 mile N of the S entrance point, and Lake Reef, with a least depth of 0.7m, lies 0.7 mile farther N. The Bloomfield River, navigable only by boats, empties into the head of the bay, about 2.5 miles WNW of the S entrance point.

Rattlesnake Point (15˚50'S., 145˚23'E.) a steep, bold bluff, attains a height of 286m less than 0.5 mile inland. It is clear of dangers, and the 10.9m line lies about 0.3 mile E.

Between Rattlesnake Point and Archer Point, about 15 miles NNW, a range of mountains up to 871m high, backs the coast within 1.7 miles inland. Coral reefs fringe most of this coast. In some places, particularly between Obree Point and Forsberg Point, the fringing reef is steep-to, with depths of 10.9m close offshore.

Obree Point (15˚46'S., 145˚22'E.) lies about 4.5 miles N of Rattlesnake Point. The intervening coast is mainly sandy in its N and S parts, with rocky ledges in the middle, then to Thomas Point, 4 miles NNW, it is fringed by drying coral reefs.

8.25 **Off-lying dangers and islands.—**The **Hope Islands** (15˚44'S., 145˚28'E.) are two sand cays, 8.5m high, located on drying reefs 4.2 to 6 miles ENE of Obree Point; the islands lie E of the recommended course. The reefs on which the islands lie are always visible, but the passage between them is not recommended. Tidal currents set through the passage between the reefs sometimes causing a short confused sea.

Anchorage.—Anchorage may be obtained, in a depth of 15.8m in the lee of the Hope Islands, 1 mile NW of the NE island. Care must be taken not to anchor in the current and to

Cape Bedford bearing 348˚, distant 7 miles

avoid the shoal patches off the N end of the passage between the reefs and Stonor Patch.

Gubbins Reef, a narrow coral reef which dries 0.9 to 1.5m in places, lies 2.7 miles SE of Thomas Point. Delius Patch, with a depth of 4.9m, lies 0.5 mile E of Gubbins Reef. Ottaway Patch, with a depth of 6.3m, lies 1 mile E of Delius Patch, and Stonor Patch, with a depth of 5.5m, lies 0.4 mile farther E.

Forsberg Point (15˚40'S., 145˚20'E.), a rocky point with a conspicuous knob, lies 2.2 miles NNW of Thomas Point.

Archer Point (15˚36'S., 145˚20'E.), 4 miles N of Forsberg Point, is a prominent rocky point, 61m high. Archer Hill, 158m high, lies 0.5 mile W of the point.

Rocky Islet, 50m high, lies 0.5 mile off the coast, 0.7 mile SSE of Archer Point. The islet is steep-to off its E side, but there is foul ground off the other sides.

Archer Point to Cape Flattery

8.26 From Archer Point, the coast trends in a NNW direction for 1.5 miles to Walker Point, then 2.7 miles farther NNW to Grave Point. Walker Hill, 177m high, rises close inland, 0.5 mile NW of Walker Point.

Walker Bay indents the coast about 1.5 miles between Grave Point and **Monkhouse Point** (15˚30'S., 145˚17'E.), 3.7 miles NNW. The Annan River empties into the W side of Walker Bay. Most of the bay is shallow and foul ground occupies its S part.

Caution.—Cowlishaw Reef (15˚32'S., 145˚19'E.) lies 2.7 miles ENE of Grave Point; it has a sand cay on its N end which dries 2.4m. Dawson Reef, which dries 1.5m, lies 1.7 miles NW of Cowlishaw Reef.

8.27 **Cooktown** (15˚28'S., 145˚15'E.) (World Port Index No. 53320) lies on the E side of the entrance to the Endeavour River, at the foot of Grassy Hill, 2.7 miles NNW of Monkhouse Point.

The port is closed to commercial shipping and is only used by small craft, fishing vessels operating off Cape York, and by tourist craft operating from Cairns. The maximum size vessel which can enter the port is 300 grt, with a draft of 2.5m.

A channel, marked by lighted beacons and maintained to a depth of 3.1m, leads to the wharf at Cooktown.

Vessels not having local knowledge are strongly advised against entering the port. From the S, a pilot may be embarked off Cairns. If approaching from the N, the harbormaster at Cairns should be advised in sufficient time to allow a pilot to proceed to Cooktown.

Pilotage is compulsory for all foreign vessels 35m long and over and is available 24 hours. Pilots are ordered through Cairns; see paragraph 8.14 for further requirements. Pilots will contact the vessel about 30 minutes prior to boarding time and board on the range line about 0.3 mile NE of Fairway Lighted Buoy. Vessels approaching and transiting the harbor should maintain a listening watch on VHF channel 16.

Indian Head (15˚23'S., 145˚17'E.), 5.5 miles NNE of Grassy Hill, rises to Rocky Mountain, 335m high, 0.7 mile W.

Nob Point, 60m high, lies 2.2 miles NNE of Indian Head, and South Cape Bedford lies 5 miles farther NE.

Caution.—The dangerous wreck of a fishing vessel lies 0.5 mile SSE of Nob Point.

8.28 **Cape Bedford** (15˚14'S., 145˚20'E.), at the N end of a headland 3.2 miles NNW of South Cape Bedford, rises almost perpendicularly to a 251m flat-topped summit.

Although South Cape Bedford is steep-to and has depths of more than 20m less than 0.2 mile SE, several 5.5m patches lie up to 0.5 mile E of the headland and 1 and 1.5 miles NE, respectively, of South Cape Bedford. Petty Patch, a 5.5m patch, lies 0.6 mile NE of Cape Bedford.

Between Cape Bedford and Cape Flattery, 16 miles N, a bight indents the coast about 6 miles W. A series of scrubby hills up to 171m high lie along this coast. The McIvor River flows into the bight, 7.7 miles NW of Cape Bedford. A conspicuous white sand patch is located in a position less than 0.5 mile inland, 1.5 miles N of the mouth of the McIvor River. Casuarina Hill, 84m high, is located 6.5 miles NNE of the white patch, and a conspicuous white sand hill, 72m high, is located 1.7 miles N of Casuarina Hill.

Most of the dangers in the bight between Cape Bedford and Cape Flattery lie within the 10m curve.

Conical Rock (15˚08'S., 145˚20'E.), 12m high, is a black rock located on the E end of a reef that lies on the edge of the 10m curve, 5.2 miles NNW of Cape Bedford.

The **Three Isles** (15˚07'S., 145˚25'E.), low and wooded, lies on a reef 8 miles NNE of Cape Bedford. Low Wooded Isle lies 2 miles NW of the Three Isles. The Two Islets are located on a reef 5.5 miles N of the Three Isles.

Cape Flattery to Cape Melville

8.29 **Cape Flattery** (14˚57'S., 145˚21'E.), a bold headland formed by an isolated range of hills which stand out from the low land in its vicinity, appears as an island when seen from a distance.

Caution.—The dangerous wreck of a fishing vessel lies 0.5 mile W of Cape Flattery.

The coast between Cape Flattery and Cape Melville, about 67 miles NW, is considerably broken by a series of bights that recede as much as 6 miles SW.

From Cape Flattery to North Bay Point, much of the coast is low and consists mostly of sandy beaches lined with mangroves. From North Bay Point to Cape Melville, the coast consists of sandy beaches that are separated by rocky points. It is backed by a range of hills that rise abruptly to heights of more than 305m, about 1.2 miles inland.

The inner edge of the Great Barrier Reef lies 2 to 17 miles offshore. In the vicinity of Lookout Point, there are a number of dangers that lie between the coast and the inner edge of the barrier reef. In the vicinity of Murdoch Point, the recommended inner route is encumbered with islands and reefs.

The Great Barrier Reef—Inner Edge—Heldson Reef to North Warden Reef

8.30 The inner edge of the Great Barrier Reef trends about 3 miles NW from Helsdon Reef and then about 10.5 miles NNE to North Direction Island. Between North Direction Island and Fly Reef, about 24 miles NW, the inner edge of the barrier reef forms a bight that recedes 12 miles NE. From Fly Reef the inner edge of the barrier reef trends 25 miles WNW to Switzer Reef, and then 14 miles NNW to North Warden Reef, about 12 miles E of Cape Melville.

Caution.—Vessels are advised to keep W and SW of the dangers described below; the exception to this is the bight formed NE of Lizard Island. The dangers marking the inner edge of the barrier reef are mostly steep-to and have depths of more than 20m close to the sides adjacent to the Inner Route.

Foul ground and detached dangers, with depths of less than 1.8m, lie up to 3 miles NW of Helsdon Reef. A 10m patch lies 3.7 miles NNW of the reef; this patch lies less than 1 mile E of the track through the Inner Route.

8.31 **Eye Reef** (14˚54'S., 145˚29'E.), with a rock on its S end which dries 1.8m, lies 2 miles N of Helsdon Reef.

The Rocky Islets, three in number, lie on a reef 1.5 miles N of Eye Reef. The largest islet rises to a height of 46m. A 2.9m patch lies about 0.2 mile SSE of the 15m high rock.

South Direction Island (14˚50'S., 145˚31'E.), 177m high, lies 3 miles NE of the Rocky Islets. The island is steep-to on its S and W sides, but reefs extend 1.2 miles N.

High Rock, 52m high, lies 1.5 miles E of South Direction Island.

Kedge Reef, an area of foul ground, lies between 1.7 and 3.7 miles N of South Direction Island.

North Direction Island (14˚45'S., 145˚31'E.), a steep bare dome-shaped island, 188m high, lies 4.7 miles N of South Direction Island. A reef fringes the island and extends about 0.1 mile offshore.

A submerged reef lies with its NW end about 2.5 miles NE of North Direction Island. The limits of this reef are not certain and vessels should stay N of a line drawn from the NW end to the reef on the S side of Cormorant Pass, 8 miles ENE.

The Great Barrier Reef—Ribbon Reef to Jewell Reef

8.32 Between the N end of Ribbon Reef and **Jewell Reef** (14˚23'S., 145˚22'E.) 22 miles NW, the Great Barrier Reef is formed by a single line of reefs, through which are a number of passes.

Cormorant Pass lies with its seaward entrance 28 miles N of Lark Pass and about 9.5 miles NE of North Direction Island. The reefs on either side show clearly, but the pass is only about 0.3 mile wide.

Tidal currents are reported to set through the pass at a considerable rate.

Fishing, other than trolling, is prohibited in Cormorant Pass.

Yonge Reef (14˚36'S., 145˚37'E.) extends about 3.7 miles NNW from a position 2 miles N of Cormorant Pass; a boulder lies on its NW end.

Carter Reef lies 0.5 mile NNW of Yonge Reef, and extends 3.2 miles NNW from its S extremity.

Half Mile Opening, a small clear passage with a least depth of 14.6m, is about 0.3 mile wide. The pass is entered between Yonge Reef and Carter Reef. The summit of Lizard Island, bearing 237.5˚, leads to the entrance.

The inner approach to Half Mile Opening has only been partially examined.

Cooks Passage lies between the N end of Carter Reef and the S extremity of Day Reef, 1 mile NW; both reefs are steep-to. The depths in the passage vary from 12.8 to 42m. Immediately outside the passage, the depths increase rapidly to more than 200m. The summit of Lizard Island, bearing 215.5˚, leads through the entrance.

There is a heavy swell with SE winds and the reefs are well-defined by breakers.

The tidal currents off the SW entrance of Cooks Passage set NE and SW and attain a rate of approximately 2 knots at springs. Outside the entrance, the current sets NW at a rate of 1.5 knots.

8.33 **One Mile Opening** (14˚28'S., 145˚31'E.) is entered between the NW extremity of Day Reef and the SE extremity of Hicks Reef, 0.7 mile NW. Hicks Reef is a crescent-shaped drying reef, with foul ground extending 1.5 miles from its SW side. The seaward side is steep-to, though pinnacles up to 200m off the outer edge have depths of 13m, with lesser depths likely. At the outer entrance, the SE edge of Hicks Reef breaks heavily in SE winds. Both sides of the entrance are steep-to, and there is a least depth of 12.2m off the S entrance, close N of Day Reef.

The opening is approached with the summit of Lizard Island bearing 195˚. Vessels then alter course to 215˚ to proceed through the center of the channel.

One and a Half Mile Opening is entered between a drying rock on the NW end of Hicks Reef and the E side of **Hilder Reef** (14˚26'S., 145˚24'E.), 1.2 miles W. Hilder Reef dries 0.9 to 1.8m and is steep-to on all sides except the SW sides. The fairway is deep except for a 12.2m patch off the NW extremity of Hicks Reef.

The tidal currents off the S entrance set N and S and attain a rate of approximately 2 knots. During strong SE winds, a heavy sea and strong irregular tidal currents are experienced.

Vessels approaching from seaward should steer for the summit of Lizard Island bearing 174˚. Once clear of the opening, vessels may join the Inner Route by passing W of the daners N of Lizard Island.

Two Mile Opening is entered between the N end of Hilder Reef and the E end of Jewell Reef (14˚24'S., 145˚24'E.). The latter reef dries 1.5 to 1.8m and its SE side is steep-to. A conspicuous boulder, 0.9m high, lies at the seaward edge of the reef, 2 miles WNW of its E end. Parke Reef lies on the NW side of the opening, 0.5 mile SW of Jewell Reef. Waining Reef, which dries 1.5m in places, lies 0.5 mile farther SW and extends 8.5 miles WSW.

Vessels enter Two Mile Opening on a SW heading proceeding through the center of the channel; the reefs on either side are normally visible.

The Great Barrier Reef—Inner Reef Northwest of North Direction Island

8.34 **Fly Reef** (14˚30'S., 145˚10'E.) lies 1.5 miles W of the W extremity of Waining Reef and 25 miles NW of North Direction Island. From this reef and from Jewell Reef, 10.5 miles NE, the Great Barrier Reef resumes its inner and outer reef characteristic.

Snake Reef, which dries, lies 6.5 miles WNW of Fly Reef. A conspicuous rock, which dries 0.9m, lies on the E end of Snake Reef and a sand cay, which dries, lies on the NW end of the reef.

Mid Reef, which dries, lies 1.2 miles W of the W extremity of Snake Reef. A depth of 8.2m lies 1.2 miles WSW of the NW point of Mid Reef. It is steep-to, with foul ground that extends 0.5 mile off its W end.

Megaera Reef (14˚29'S., 144˚58'E.), which dries, lies 0.4 mile off the middle of the S side of Mid Reef.

The Beanley Islets, about 6.1m high, lie on the S side of a steep-to reef, 2.5 miles NW of Mid Reef; they are part of the Howick Group. Ingram Islet, a sand cay 9m high, lies on the N extremity of the reef. Stapleton Islet, 4m high, lies on the NW side of a reef, 6.5 miles NNW of Ingram Islet.

Ingram Island (14˚24'S., 144˚52'E.) is a wooded sand cay. Anachorag Area II is situated 0.8 miles NW of Ingram Island, in a depth of 20m.

Switzer Reef (14˚22'S., 144˚45'E.), a steep-to reef which dries 1.2m, lies on the W side of the S entrance to Waterwitch Passage, 7 miles NW of Ingram Islet.

A shoal, with a least depth of 11m, lies 0.5 mile off the middle of the SW side of Switzer Reef, and 7m and 7.9m patches lie between the outer and inner track, 2.2 miles SW of the same reef.

Davy Patches (14˚20'S., 144˚43'E.) lie 1 to 2 miles NW of Switzer Reef. There is a least depth of 1.8m at their NW end. The Inner Route passes about 1.5 miles W of Davy Patches.

Munro Reef, which dries, lies 0.5 mile N of Switzer Reef. Foul ground extends 0.5 mile from the SW side of Munro Reef.

Unison Reef (14˚18'S., 144˚41'E.) lies 1.5 miles NW of Munro Reef. A boulder, 1.5m high, lies on the N extremity of the reef.

South Warden Reef is an extensive reef which is steep-to on its W side. It is separated from Unison Reef by a channel 0.7 mile wide. Below-water reefs, which never dry but are always visible, extend 2 miles N from South Warden Reef, and foul ground extends 1 mile farther N.

Broomfield Rock (14˚12'S., 144˚39'E.), awash, lies 1.5 miles NNW of South Warden Reef, on the edge of the foul ground which extends N from the reef.

North Warden Reef lies 2.7 miles N of Broomfield Rock and 7 miles E of Cape Melville. The reef is fouled with rocks on all sides.

The Great Barrier Reef—Jewell Reef and Waterwitch Passage

8.35 Between Jewell Reef and Waterwitch Passage, 32 miles WNW, the outer edge of the Great Barrier Reef is formed by reefs of various sizes and shapes, between which are many narrow openings. None of these openings should be attempted as the area between them and the Inner Route has not been properly examined.

Waterwitch Passage (14˚11'S., 144˚53'E.) is entered between No. 1 Sandbank, which is 0.6m high, and a similar reef 1.2 miles NW.

A shoal, with depths of 5.5 to 8.5m, with a below-water rock off its SW end, lies off the NW entrance point of the passage. Heavy tide rips occur over this shoal. Another reef, with a depth of 5.5m, lies 0.7 mile farther SW.

Vessels entering Waterwitch Passage should steer for Stapleton Islet bearing 190˚. When about 4 miles N of Stapleton Islet, steer to pass 1 mile W of it, then to the Inner Route, passing about 1.2 miles SE of Switzer Reef.

Cape Flattery to Lookout Point

8.36 From Cape Flattery, previously described in paragraph 8.29, the coast trends 9.5 miles NW to Lookout Point, then 23 miles farther NW to Murdoch Point. The coast in the first 9.5 miles consists of sandy beaches and low mangrove shores. Northwest of Lookout Point, the coast consists of a low mangrove shore with numerous creeks.

The 10m curve lies 3 miles offshore in the S part of this coast and 7.5 miles off in the N part. There are numerous dangers inside and outside the 10m curve.

Cape Flattery Harbor (14˚57'S., 145˚21'E.) is located on the W side of Cape Flattery, which shows a light, and is an open roadstead. Cape Flattery Inner Harbor is located on the W side of the spit extending 2 miles NNW from the N extremity of Cape Flattery and consists of a small jetty for local traffic.

Cape Flattery Offshore Wharf extends about 400m from the SE extremity of the cape. The port was developed for the export of silica sand.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Tides—Currents.—It is reported that the current normally sets NE under the wharf at rates of up to 1 knot, but may be stronger during the wet season, which is December to March. Following N winds, the set is occasionally S or SW. Berthing may be suspended in wind velocities exceeding 20 knots.

Depths—Limitations.—The offshore wharf and trestle jetty has a berthing length of 230m and an alongside depth of 15m.

Cape Flattery bearing 297˚, distant 4 miles

Vessels of up to 60,000 dwt and a maximum length of 250m can be accommodated.

Vessels are usually berthed starboard side-to on the NE side of the wharf using the ship's anchor.

Aspect. —A beacon on the knuckle of the offshore wharf, and a lighted beacon 90m NE, in line bearing 215˚, lead to the inshore end of the berth.

Lights are shown from the mooring dolphins.

Pilotage.—Pilotage is compulsory for all vessels berthing at the offshore wharf and is arranged through Cairns. Notice should be forwarded 48 hours prior to arrival and the ETA confirmed or amended 24 hours before arrival. Pilots board either at the anchorage or about 3 miles N of the wharf.

Anchorage.—Anchorage may be obtained by vessels of suitable draft about 1.5 miles N of the inner harbor jetty, in depths of 6 to 7m, locally known as No. 1 Anchorage Area. The approach to this anchorage is made E of the dangerous wreck lying 2.75 miles NNW of this jetty. Alternatively, No. 2 Anchorage Area can be used in good weather, in depths of 27m, in position 14 56.8'S, 145 22.2'E, lying on the W side of the two-way route, about 2.5 miles NNE of the offshore wharf.

An anchorage, with a least depth of 8m, is established in the lee NW of Cape Flattery within the area delimited by the following coordinates:

a. 14˚52'48"S, 145˚15'42"E.
b. 14˚53'00"S, 146˚16'42"E.
c. 14˚54'30"S, 145˚18'50"E.
d. 14˚54'02"S, 145˚16'42"E.

Vessels awaiting berthing instructions should proceed to the above anchorage.

Vessels in ballast anchor on the range as convenient for their draft, outside the 5m line.

8.37 Lookout Point (14˚50'S., 145˚14'E.) is a bare, red-colored hill, 84m high, that appears as an islet from a distance. The land in the vicinity of the point is low and has numerous sandhills. A conspicuous white sandhill, 49m high, lies about 4 miles WSW of Lookout Point.

Although the point is closely fringed with foul ground, it is fairly steep-to on its NE side, with the 10m curve less than 0.5 mile offshore. A detached patch, with a least depth of 1.2m, lies 2.5 miles NW of Lookout Point.

Decapolis Reef (14˚51'S., 145˚16'E.), marked by a light, dries 1.5m; it is a small reef which lies on a 9.1m patch, 2.7 miles SE of Lookout Point.

Four Foot Rock, with a depth of 1.2m, lies 0.7 mile W of Decapolis Reef.

Sim Reef (14˚49'S., 145˚17'E.), with a depth of 0.6m, lies 2 miles NNE of Decapolis Reef, and is not easily seen unless marked by tide rips. A coral head, with a depth of 4m, lies 0.7 miles SE of the reef, and a 6.4m patch lies 0.5 mile NW of the reef. The alternative course for the Inner Route lies W of Sim Reef.

8.38 Off-lying dangers and islands.—Linnet Reef (14˚47'S., 145˚21'E.), which dries in places, lies 6.7 miles ENE of Lookout Point. The reef is steep-to on its SW and SE sides. A reef, with depths less than 1.5m, lies 1 mile W of Linnet Reef and is difficult to make out.

Martin Reef, a drying reef, lies close N of Linnet Reef. Boulders, which dry, lie on the SE side of the reef and a drying sand cay lies on its NW end.

Eagle Islet, low and covered with bushes, lies near the N end of an extensive reef, 3.7 miles NNE of Martin Reef. The reef is steep-to and has sand banks on it extending S from Eagle Islet, which uncover at low water springs. Depths of 7.3m and 8.5m are charted 6.5 miles WSW and 5.7 miles W, respectively, of Eagle Islet.

Lizard Island (14˚40'S., 145˚28'E.), 359m high, with a bare dome-shaped summit, lies 4 miles ENE of Eagle Islet. This is- and forms a good mark when approaching the passes in the Great Barrier Reef that lie NE of it.

Lizard Island

Palfrey Island, 137m high and South Islet 123m high, are located on reefs, 0.5 mile SSW and 1 mile S, respectively from Lizard Island. The recommended Inner Route passes between Palfrey Island and Eagle Islet, 3.5 miles W.

A reef, which dries in places, lies 2 miles E of the N extremity of Lizard Island.

Petricola Shoal (14˚38'S., 145˚28'E.), with a depth of 4.9m, lies 1.5 miles NE of Lizard Island.

Stewart Shoal, with a least depth of 5.8m, lies 2 miles NNE of Lizard Island. A 10.4m shoal lies 1 mile W of Stewart Shoal.

Underwood Shoal (14˚35'S., 145˚28'E.) has a charted depth of 4.9m about 3.2 miles NNE of Lizard Island.

Caution.—The shoals charted N and E of Lizard Island lie on an extension of the recommended courses through the Great Barrier Reef.

Lookout Point to Murdoch Point

8.39 From Lookout Point to Murdoch Point, the coast recedes about 4.5 miles and is fronted by a mud bank which extends up to 1.2 miles offshore in places.

North Sand Hill, 59m high, rises 5.5 miles W of Lookout Point.

Round Hill (14˚48'S., 145˚01'E.), a distinctive dome-shaped hill, 175m high, which is prominently in front of the rest of the hills, lies 7.7 miles WNW of North Sand Hill.

The **Pethebridge Islets** (14˚44'S., 144˚06'E.), two wooded islets about 6.1m high, lie about 9.5 miles NW of Lookout Point. The E islet, marked by a light, lies outside the 5m curve. These islets are located on the SW side of an alternative navigational track that passes between the islets and Turtle Reef, about 3.7 miles ENE.

The **Turtle Group** (14˚43'S., 145˚12'E.), six low, wooded islets and shoals, lie between 5.5 and 10 miles NNW of Lookout Point; all the islets are reef fringed. Depths of less than 2.7m lie about 2 miles NE of the largest islet.

Gunga Shoal, a below-water coral patch, lies 9 miles NNW of Lookout Point. A 2.7m patch lies 1 mile WNW of Gunga Shoal. Both of these dangers are steep-to and as the water in the vicinity is much discolored, they are difficult to distinguish even when close to.

Nymph Island (14˚39'S., 145˚15'E.), a low, wooded island fringed by reefs, lies 3.7 miles NE of the NE islet of the Turtle Group. A 9.8m patch lies 2.7 miles N of Nymph Island. Patches, with depths of 8.6m and 11.7m, lie 2.7 miles N and 2.2 miles NNE of Nymph Island. These patches lie within 0.4 mile N of the Two-way Route. The recommended Inner Route lies 1.5 miles NE of Nymph Island.

Turtle Reef lies 3.7 miles ENE of the light on Pethebridge Islet. A sand cay, sometimes awash at HW, but always visible, lies on the NW end of the reef. A detached sandbank, which dries at LWS, lies 0.5 mile SSW of Turtle Reef.

8.40 Murdoch Point (14˚37'S., 144˚55'E.) is a low, sandy, ill-defined, rounded projection, fronted by a drying reef extending 0.7 mile offshore. A detached drying reef, 2.5 miles long, lies parallel with the coast S of the point and 1.2 miles from it.

Murdoch Island, a low island, lies on the N part of the detached reef, 1 mile ENE of Murdoch Point. From Murdoch Point, the coast trends 22 miles NW to Barrow Point.

Beatrice Reef, 2 miles N of Murdoch Island, dries in places, but is difficult to distinguish when covered.

Miles Reef (14˚32'S., 144˚55'E.), two steep-to reefs, 0.2 mile apart, lies 1.7 miles N of Beatrice Reef.

The Cole Islands, a groups of four islets, lies on the edge of a bank, 3.5 miles NNW of Murdoch Point.

Sand Islet (14˚31'S., 144˚51'E.), 1.8m high, lies 2 miles NNW of the NW islet of the Cole Islands.

Off-lying Islands

8.41 Howick Island (14˚30'S., 144˚58'E.), part of the Howick Group, is the largest island of this group. Howick Island is 56m high and lies 7 miles NNE of Murdoch Point.

Houghton Island, 9.1m high, lies 0.5 mile S of Howick Island; it is steep-to and reef fringed, with depths of 10m within 0.3 mile of the shore.

Anchorage.—Vessels may take good anchorage in a position a little over 0.3 mile N of the W end of the island, in a depth of 16.5m.

Coquet Island (14˚33'S., 144˚59'E.), the farthest SE of the Howick Group, is 16m high. A reef fringes the islet to 0.3 mile distant. A light is shown from the W side of the island. A channel 0.7 mile wide separates this islet from Houghton Island.

Anchorage.—Vessels may anchor, in 12.8m, 0.3 mile NNW of the light on the W end of the islet.

Wilson Rock, a detached pinnacle with a depth of 5.5m, lies 0.7 mile W of Houghton Island.

Newton Island (14˚30'S., 144˚55'E.), 2 miles W of Howick Island, is fringed by a reef, and is mangrove fringed except on its NW side, where there is a sandy point. The alternative route lies 0.5 mile SW of this island.

Watson Island, 7m high, lies on the S end of a drying reef 2.2 miles NW of Newton Island. A light is shown from the island.

Bewick Island (14˚26'S., 144˚49'E.), 12m high, lies 4.5 miles WNW of Watson Island.

Anchorage.—Anchorage may be obtained, in 13 to 15m, mud, close off the NW side of Bewick Island.

A wreck, with a depth of 8.7m, lies near the alternative track, 2 miles WSW of Bewick Island.

Murdoch Point to Barrow Point

8.42 Red Point (14˚33'S., 144˚46'E.), 9.1m high and cliffy, lies 9 miles WNW of Murdoch Point. Brown Peak, 200m high, lies 1 mile inland, midway between these two points. A range of hills extends 4 miles S of Red Point.

From Red Point to Barrow Point, the coastal dangers are contained within the 10m curve, which lies up to 5.5 miles offshore N of Red Point. There are a number of detached dangers off this coast.

Noble Island (14˚30'S., 144˚46'E.), 2.2 miles N of Red Point, rises to a height 122m. A reef fringes the island.

Wooden Patch, a sand and mud patch with a depth of 6.4m, lies on the edge of the 10m curve, 2.2 miles N of Noble Island.

Baron Reef, which dries at LW, lies 3.7 miles WSW of Wooden Patch, and Weigall Reefs, which lie close offshore, lie 2.7 miles farther W. A patch, with a depth of 6.7m, lies 4.5 miles NNW of Baron Reef.

Cape Bowen (14˚31'S., 144˚40'E.), a cliffy, ill-defined point, 6.1m high, lies 6.7 miles WNW of Red Point. It lies at the NE end of a detached range of rocky hills that are remarkable for the basaltic columns on them. Cone Peak, 534m high, the E summit of the range, lies 1.5 miles SW of Cape Bowen; it is conspicuous from the E and N.

Barrow Point (14˚22'S., 144˚39'E.), 8.7 miles NNW of Cape Bowen, is the E extremity of a peninsula that extends NE from the plain S of it. The point is 130m high and presents a barren appearance.

A 7m patch, lying 4.7 miles SE of Barrow Point and close SW of the Two Way Route, is covered by the red sector of South Barrow Island Light.

The Barrow Islets are located 0.5 mile NE of the peninsula, on a drying reef. The 20m curve lies about 0.3 mile off the SE islet.

Barrow Point to Cape Melville

8.43 From Barrow Point, the coast trends NNW 14 miles to Cape Melville. The coastline is irregular. Ninian Bay is formed between Barrow Point and North Bay Point, 6 miles NNW, and smaller indentations are formed between North Bay Point and Cape Melville.

Ninian Bay is shallow, and formed by sandy beaches separated by rocky points, and backed by low, wooded ground. The head of the bay is reef-fringed. A reef, which dries 1.2m, lies off a cliffy point, 11m high, 3.7 miles WNW of the Barrow Islets.

Beabey Hill, 145m high and prominent, rises 3.5 miles SSW of North Bay Point.

North Bay Point (14˚16'S., 144˚36'E.) rises abruptly to a hill, 131m high, about 0.3 mile W. The 323m high summit of Temple Hill, the highest in the vicinity, rises 2 miles W of North Bay Point. The 10m curve lies 0.4 mile E of this point, but depths shoal to less than 3.7m immediately within this curve.

Between North Bay Point and Cape Melville, the coast trends fairly regularly in a NNW direction and consists of sandy beaches separated by rocky points. This section of the coast rises abruptly to a range of hills about 0.5 mile inland, with higher peaks, up to 414m, less than 2.5 miles inland. The Melville Range rises to a summit of 613m, about 6 miles WSW of North Bay Point.

The 10m curve, which contains the coastal dangers, lies 1 to 2 miles offshore on this coast.

A dangerous steep-to shorebank, with depths of less than 1.8m, extends about 3.2 miles NNW from North Bay Point. This shore bank is just inside the 10m curve and there are depths of more than 12.8m close off it.

Rocky Point Islet, 20m high, lies close to the shore, 2 miles NW of North Bay Point.

Singleton Patch (14˚10'S., 144˚35'E.), a steep-to 8.3m pinnacle, lies on the N side of the Inner Route, 4 miles N of Rocky Point Islet.

Hales Islet lies on a dangerous steep-to shorebank, 1 mile SE of Cape Melville and about 0.3 mile offshore. An obstruction, with a depth of 9.9m, lies 1 mile NE of Hales Islet.

8.44 **Cape Melville** (14˚10'S., 144˚31'E.) rises to a height of 118m a short distance SE; it lies at the N termination of the high range of rocky hills that backs the coast N from North Bay Point. The cape is remarkable for the immense granite blocks on it.

Anchorage Area designated CM is situated 3.5 miles due W of Cape Melville, in a depth of 6m.

Wedge Rocks, 9.1m high, lies close off the NE extremity of the cape. Several rocks fringe the N end of the cape and Cape Rock, 14m high lies off the NW extremity of the cape.

Boulder Rock, 24m high, lies just inside the 10m curve, 1 mile NNW of the NW end of Cape Melville. A detached rock, almost awash, lies less than 0.5 mile NE of Boulder Rock.

Channel Rock (14˚08'S., 144˚29'E.), which covers 0.9m, lies 0.7 mile N of Boulder Rock, just inside the 20m curve.

Cape Melville to Claremont Point

8.45 The coast between Cape Melville and Claremont Point, about 50 miles WNW, recedes S to form two bays, Bathurst and Princess Charlotte. Bathurst Bay indents the coast about 5 miles SSE between Cape Melville and Bathurst Head, 17 miles WSW. Princess Charlotte Bay indents the coast 20 miles SSW between Bathurst Head and Claremont Point, 34 miles WNW.

Several detached hills lie close to the coast between Cape Melville and Bathurst Head, and the Bathurst Range rises abruptly from the coast to a height of 329m, extending a short distance S from the latter head. The land in the vicinity of Princess Charlotte Bay is low.

Many of the dangers fringing the coast are contained within the 10m curve, which follows the coastal trend between 0.2 mile and 6.2 miles offshore, except that it lies 13 miles seaward of the head of Princess Charlotte Bay. Several steep-to islands and other dangers lie between the 10m curve and the inner edge of the barrier reef. The depth curves cannot generally be relied upon to give adequate warning of these dangers. The inner edge of the Great Barrier Reef lies from 3.7 to 26 miles offshore.

Tides—Currents.—In general, the N set of the flood current and S set of the ebb current that prevails on this coast is interrupted by the tidal flow in and out of Princess Charlotte Bay, where there is a tidal rise of 3.2m.

Between Cape Melville and Claremont Point, the tidal currents set SW or S into Princess Charlotte Bay on the rising tide and in an opposite direction on the falling tide. The ebb current tends to set in a N direction out of the bay.

In the vicinity of Princess Charlotte Bay, from April to November, the Southeast Trades cause a current that sets N or NW at rates of 0.5 to 1.2 knots. The resultant of this current and the tidal current almost always sets N at a rate of 1.2 to 2 knots during the falling tide and up to 0.5 knot during the rising tide. During the Northwest Monsoon, December to March, the resultant set of the wind and tidal currents is more frequently to the S than N. During this season, the flood current setting into the bay is sometimes overcome by an outset from the bay that is probably caused by fresh water discharged from the rivers which empty into the bay. A drift of 2 knots has been reported after heavy rains.

8.46 Except for the Flinders Group, the dangers inside the 10m curve are described with their related coastal features. The Flinders Group and other islands and dangers between the 10m curve and the inner edge of the Great Barrier Reef are described below.

The **Pipon Islets** (14˚07'S., 144˚31'E.), four in number, lie on a drying reef, 2.5 miles N of Cape Melville. The S islet is 12m high and tree covered; a light is shown from this islet. The reef is steep-to except for depths of 11m and less which lie 0.4 mile off its NW side.

Oswald Shoal lies 1.5 miles NW of the light on the Pipon Islets. It has a depth of 3.9m.

Pipon Shoals (14˚06'S., 144˚32'E.), with a least charted depth of 0.9m lie about 0.5 mile NNE of the Pipon Islets. They consist of shoal patches located on an 11m bank.

Aylen Patch, with a depth of 9.1m, lies 2.5 miles NW of Pipon Islets Light. There is a 12.9m patch 3.2 miles WNW of Aylen Patch. Anchorage Area PI is situated 1 mile WNW of Pipon Island, in depths of 10 to 15m.

King Island (14˚06'S., 144˚20'E.) is a low, wooded, reef-fringed island that lies 9.7 miles WNW of Cape Melville.

Atkinson Reef, a small coral reef with a depth of 2.7m, lies on the outer end of a spit which extends 3 miles WSW from King Island. The reef is not marked by tide rips.

Flinders Group (14˚10'S., 144˚15'E.) consists of five, high, rugged islands, partially covered with stunted trees and scrub, which lie between 1.5 and 7.5 miles N of Bathurst Head. Stanley Island is the farthest N of the group.

8.47 Cape Flinders (14˚08'S., 144˚14'E.), a steep-to point of land, is the N extremity of the island; it lies 3 miles W of Atkinson Reef. Two peaks rise to a height of 205m and 187m, respectively, 1.5 miles SE of Cape Flinders. A knob on the W slope of the peaks is prominent from the NE and S. The W part of the island has a table-topped summit with a height of 123m, and is the only prominent feature on this part of the island. The E and W parts of the island are connected by a low isthmus.

Flinders Rock, a 7.3m pinnacle marked by rips on the ebb, lies 0.5 mile N of Cape Flinders.

Flinders Island (14˚11'S., 144˚15'E.), the largest island of the group, is separated from the SE side of Stanley Island by Owen Channel, which is about 0.6 mile wide. The island rises to Flinders Peak, 317m high, in the S part of the island. Pirie Head, 85m high, is a precipitous headland located on the SE end of Flinders Island.

A reef fringes Flinders Island to about 0.3 mile offshore, except that it extends about 0.7 mile from the head of a bight on the NW side of the island. A small detached reef that dries 3m, lies 0.3 mile offshore, 0.7 mile SW of Pirie Head.

Owen Channel is only suitable for small vessels, although there are depths of 5.8 to 16.5m; there are a number of 5.5m patches in its NW part.

Fly Channel separates Flinders Island from the islands about 1 mile farther S. Although there are depths of 8.5 to 14.6m in the fairway, the channel is not recommended because of the existence of dangerous rocks.

Sentry Rock, a 3.6m pinnacle, lies in the middle of the channel about 1 mile SSW of Pirie Head.

Stainer Rock, with a depth of 5.5m, lies on the S side of the channel 0.9 mile WNW of Sentry Rock.

Maclear Island (14˚13'S., 144˚15'E.), on the S side of Fly Chan-nel, lies 2 miles WSW of Pirie Head. The island is 24m high, with a rocky islet 6.1m high WNW of it. Both are fringed with drying coral reefs, with a channel 150m wide between them.

Denham Island, the farthest SE of the Flinders Group, rises to 201m near its SE extremity. Howard Bluff, 49m high, the NE extremity of the island, is a cliff with an overhanging top. The SE coast is bold, precipitous, and steep-to.

Blackwood Island, 1 mile WNW of Denham Island, rises to a rounded summit, 178m high at its NE end. Pullen Point, 6m high, lies at the SW extremity of the island, at the end of a long narrow neck which has several mounds up to 44m high on it.

In 1989, it was reported that the dangerous wreck of a fishing vessel lies 0.5 mile W of the summit of Blackwood Island.

Anchorage.—During SE winds, vessels can take anchorage 0.5 mile offshore in Anchorage Area SB (Stokes Bay) located on the W side of Stanley Island, in a depth of 16m. Anchorage Area WB, situated halfway between Cape Flinders and Nares Point, has depths ranging from 10 to 13m.

Anchorage can be taken, in 11m, mud, off the W side of Blackwood Island, 1 mile N of Pullen Point. This anchorage is not recommended when the wind is N of E.

8.48 Clack Reef (14˚04'S., 144˚14'E.) lies 3 miles N of Stanley Island, on the N side of the Inner Route.

Clack Islet, 43m high, lies on the SE extremity of the reef. An islet, 15m high, lies on the E end of the reef, just over 1 mile NNE of Clack Islet. A rock, which dries 1m, lies on the W extremity of the reef, 2.5 miles WNW of Clack Islet. A depth of 9.6m is charted 1.2 miles WSW of Clack Islet, close off the reef.

Wharton Reef (14˚08'S., 144˚00'E.) is a steep-to reef that lies 12 miles WSW of Clack Reef. It is located about 1.5 miles S of the Inner Route, in the middle of the entrance to Princess Charlotte Bay. A light is shown from the E end of the reef; drying rocks are located 0.8 mile WSW of the light on the W extremity of the reef.

Clark Shoal, a steep-to coral patch with a depth of 6.4m, lies 3.2 miles W of Wharton Reef.

Olive Patch, with a depth of 5.5m, lies about 4 miles SW of Wharton Reef. A depth of 9.6m is charted 1.5 miles S of the patch.

Claremont Point (14˚00'S., 143˚41'E.) is described in paragraph 8.55.

The Great Barrier Reef—Inner Edge—North Warden Reef to Iris Reef

8.49 The inner edge of the Great Barrier Reef trends NW from North Warden Reef to a position 5 miles NE of Cape Melville at Melanie Rock, then about 8.5 miles N to the inner end of North Broken Passage. It then trends about 44 miles W to Fahey Reef and then 5.5 miles NNW to Iris Reef, which lies 9.5 miles ENE of Claremont Point. Vessels should keep W and S of a line connecting the following dangers, which mark the inner edge of the Great Barrier Reef. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Melanie Rock (14˚06'S., 144˚34'E.), with a least depth of 1m, lies about 4.5 miles NW of the N end of North Warden Reef. Foul ground, with 4.9 to 9.1m patches, extends 2.5 miles ESE from the rock. The area E and NE of Melanie Rock is mostly unexamined.

Eves Reef (13˚58'S., 144˚34'E.) lies 8 miles N of Melanie Rock. The waters E of a line drawn from Melanie Rock to Eves Reef have not been examined sufficiently for safe navigation.

North Broken Pass lies E of Eves Reef and South Broken Pass lies between Eves Reef and Tydeman Reef, 2 miles W. Neither pass is recommended.

The line of reefs that trend W from Eves Reef to Lowry Passage, 11 miles distant, is not more than 2 miles wide and forms both the inner and outer edges of the Great Barrier Reef.

8.50 **Tydeman Reef** (13˚59'S., 144˚31'E.), which dries, lies 2 miles WSW of Eves Reef. A shoal, with a depth of 3.9m, lies off the E end of the reef.

Melville Pass lies between the W end of Tydeman Reef and Davie Reef, 1.7 miles W. There are boulders 0.6m high, on the SW end of Davie Reef. Detached shoal patches, with depths of 4.9 to 16.5m, on either side of the channel, reduce the navigable width to 0.7 mile.

Tidal currents set N and S in Melville Pass and attain a rate of 2 knots at springs, when eddies are formed and the water discolored.

Pipon Islet Light bearing 167.5˚ leads through Melville Pass from seaward, in depths of 22 to 30m.

West Melville Pass lies with its seaward entrance between Davie Reef and Wilson Reef (13˚57'S., 144˚24'E.), which dries, 1.5 miles W. There is a beacon on the SW extremity of Wilson Reef.

Several shoal patches on the W side of the channel, with depths of 8.8 to 10m, reduce the navigable width of the pass to 0.4 mile.

Tidal currents in West Melville Pass set NE and SW; they attain a rate of approximately 2 knots at springs.

West Melville Pass is a safe channel which leads directly from seaward to the Inner Route.

Flinders Peak, 17 miles SW of West Melville Pass, bearing 218˚, or at night, King Island Light bearing 221˚, leads through the pass in depths of 20 to 30m, however, the former leads close to Davie Reef.

Joan Reef (13˚57'S., 144˚21'E.), which dries, lies 1.2 miles W of Wilson Reef. The reef is steep-to except for depths of 5.8 and 6.1m lying close off its NE and SW ends, respectively.

Lowry Passage lies between Wilson Reef on the E and Joan Reef on the W; it is deep and clear of dangers.

Tidal currents in Lowry Passage are strong and cause eddies and discolored water, especially at springs.

Flinders Peak bearing 203˚, or at night, King Island Light bearing 195.5˚, lead through Lowry Passage in a least depth of 29m.

Corbett Reef, on the inner edge of the barrier reef, extends 15 miles SW from a position 6.2 miles W of Joan Reef. The SE side of the reef has not yet been clearly defined. The SW end is steep-to and dries in patches, with rocks which dry to 2.2m.

8.51 **Eden Reef** (14˚05'S., 143˚55'E.), a steep-to reef which dries 1.5m, lies 5 miles W of the W extremity of Corbett Reef. A light is shown from the reef, which is located 1 mile N of the Inner Route.

Taiwan Shoal, Cameron Shoal, and Keast Shoal, with depths of 4.6m, 4.6m, and 7.3m, respectively, lie between Eden Reef and Grub Reef, 2.2 miles NNE.

Fahey Reef (14˚04'S., 143˚51'E.), 3.2 miles WNW of Eden Reef, dries 0.9 to 1.5m, and is steep-to. A light is shown from the reef. A strong E set on the ebb at springs has been reported in the vicinity of the reef.

Beabey Patches, a group of coral heads with a least depth of 5.5m, lie 3 miles NW of Fahey Reef. The Inner Route lies 1.2 mile SW of the 5.5m patch.

Iris Reef, which is steep-to on its W side, lies 2.5 miles N of Beabey Patches. The reef dries 1.2m, and Stainer Islet, 2m high, lies on its NW side. A lighted buoy is moored 1.8 miles W of Iris Reef.

The Great Barrier Reef—Outer Edge—Waterwitch Passage to Lowry Passage

8.52 From the NW side of Waterwitch Passage, the outer edge of the Great Barrier Reef trends about 21 miles NW in an unbroken line with no apparent openings. It then turns abruptly SW for 2 miles to North Broken Passage, an opening which lies 13 miles NNE of Cape Melville. The passages and reefs W of this passage, to Lowry Passage, 12 miles farther W, have been described with the inner edge of the Great Barrier Reef.

Bathurst Bay is entered between the W extremity of Cape Melville and the E extremity of **Bathurst Head** (14˚15'S., 144˚15'E.), 17 miles WSW; the 5m curve lies 5.2 miles off the head of the bay.

From the W extremity of Cape Melville to a point 10.5 miles SW, the coast is formed by a sandy beach backed by sparsely-wooded ground.

Islets, with a few bushes on them, lie between 1 and 2.5 miles N of the point mentioned above.

Bathurst Head is a rugged projection which terminates in three points; the central and N point is **Combe Point** (14˚15'S., 144˚13'E.), with a small bay on each side. Within the three points, the head is formed by a tableland covered with trees, which fall abruptly near the coast.

Rattlesnake Channel lies between Bathurst Head, on one side, and Denham Island and Blackwood Island of the Flinders Group, on the other side. The channel is about 0.8 mile wide between the 10m curve and is clear of dangers.

8.53 Princess Charlotte Bay, an extensive bay that lies between Bathurst Head and Claremont Point, 34 miles NW, has a mud bank which extends 2 miles offshore at its head. The 10m curve lies up to 12.5 miles from the head of the bay.

The E shore of the bay along Bathurst Head for a distance of 2.7 miles is steep and wooded. From this point to the mouth of the North Kennedy River, at the head of the bay, a distance of 19 miles, the shore is fronted by mangroves and backed by tidal flats.

For a distance of 3 miles W of the North Kennedy River, the shore is mangrove fringed; then for a distance of 15.5 miles NW it is formed by swampy ground. From this point to Claremont Point, 13 miles N, the shore of the bay is devoid of any remarkable features, except for a conspicuous clump of trees 6 miles S of Claremont Point.

Jane Table Hill (14˚30'S., 144˚08'E.), 161m high, and Jeannette Hill, 83m high, 1 mile SSE, are located 16 miles SSE of Bathurst Head. Jane Table Hill is easily identified, owing to its position in the low, flat ground in its vicinity.

June Reef, which dries 0.9m, lies within the 5m curve, 15 miles NW of theNorth Kennedy River.

The **Cliff Islands** (14˚14'S., 143˚47'E.) are a group of three islets that lie close together between 3 and 4.5 miles off the W side of Princess Charlotte Bay, in a position 3.2 miles N of June Reef. The E islet is 15m high and the N islet is 23m high. They are located within the 5m curve on the E end.

8.54 Port Stewart (14˚05'S., 143˚41'E.) (World Port Index No. 53310) is a small settlement situated on the Stewart River, 10.5 miles NNW of the Cliff Islands. Claremont Point is located 3.7 miles farther N. Local knowledge is essential.

Anchorage.—Anchorage may be taken anywhere in Princess Charlotte Bay outside the 5m curve, but care must be taken to avoid Olive Patch and the shoal patches in the vicinity. Good anchorage during E winds can be taken, in 9.1m, mud and shells, about 2 miles WSW of the NW extremity of Bathurst Head. When the SE winds are strong off Cape Flinders and Cape Melville, it is invariably light in the bay.

Claremont Point to Cape Direction

8.55 Claremont Point (14˚00'S., 143˚41'E.) is a low, wooded projection of the mainland that is relatively inconspicuous. A shorebank, with depths of less than 5.5m, extends nearly 2.2 miles E from the point. Several detached coral patches, with depths of less than 1.8m, lie 1.2 miles and 1.5 miles ENE of the point.

The coast trends fairly regularly about 71 miles NNW from Claremont Point to Cape Direction and consists mostly of sandy beaches along which numerous small rivers and creeks empty.

Much of the coast is fringed with reefs; there are many detached reefs, shoal patches, and islets between the coast and the inner edge of the barrier reef. These dangers are particularly numerous between Campbell Point and Cape Direction. The inner edge of the Great Barrier Reef lies 4 to 10 miles off this coast.

Between Claremont Point and Campbell Point, 29 miles NNW, the low coast recedes about 5.5 miles W and consists of sandy beaches fringed with sandbanks and coral reefs. It is backed by low land to a position 6 miles SSW of Campbell Point, where the coastal range again begins to closely back the coast.

The Embley Range is the only feature on this coast that is notable.

Round Mountain (13˚34'S., 143˚31'E.), 320m high and rounded, rises on the N end of the range; Hobbs Hill, 208m high, with a sharp sugar loaf top, rises near the S end of the range.

The coastal dangers on this coast are contained within the 5m curve. Only the more prominent dangers within the 5m line will be described.

Obree Reef (13˚59'S., 143˚41'E.) lies on the shorebank 2 miles N of Claremont Point.

Rattlesnake Reefs, which consist of a coral reef, awash, and three reefs which dry between 0.6 and 1.2m, lies 4 miles NNW of Obree Reef, close to the E edge of the coastal bank.

Colmer Point, about 17 miles NNW of Claremont Point, is a low point that lies close S of the mouth of the Rocky River.

Holdsworth Rock (13˚46'S., 143˚36'E.), with a depth of 3.6m, lies outside the 5m curve, 4.2 miles ENE of Colmer Point.

Frenchman Reef, which dries 2.4m, lies 2.2 miles NNE of Colmer Point.

The **Chester River** (13˚42'S., 143˚33'E.) enters the sea 4 miles N of Colmer Point. This is the most important river in this area. A ledge of coral rocks, which dry, lie on the edge of the drying sand bank, which extends 0.4 mile from the entrance. Small vessels with a draft of 1.5m can enter the river at HW.

8.56 Campbell Point (13˚32'S., 143˚35'E.) lies on the N side of the Nesbit River, 10 miles NNE of the Chester River. A hill rises to a height of 59m, 1.5 miles NW of the point.

From Campbell Point, the coast trends N 1.7 miles to a red sandstone cliff 18m high. Between the red cliff and Cape Sidmouth, 6 miles farther N, the coast is low and consists of a sand beach. Several hills and a coastal range back this coast from 1 to 5 miles inland.

Whale Hill (13˚29'S., 143˚32'E.), 306m high, is a table-topped hill that lies 4.7 miles NNW of Campbell Point; it lies at the SE end of the Macrossan Range, which extends 7 miles N.

This section of the coast continues to be fronted by a shore bank, with the 5m curve lying 3 miles offshore.

Bell Bank (13˚27'S., 143˚37'E.), which dries 1.5m, is about 1 mile long and lies 2 miles offshore in a position 5 miles NNE of Campbell Point. The E edge of this bank is coral.

Cape Sidmouth (13˚25'S., 143˚36'E.), a bare, rocky point with a sandy beach, rises abruptly to two hummocks which have a height of 62m. From a distance S or N, the cape appears as an island.

Roskruge Reef, awash, lies 1.7 miles N of Bell Bank and 1.7 miles E of Cape Sidmouth.

8.57 Between Cape Sidmouth and Friendly Point, a low sandy point 2.2 miles N, the coast is low and fronted by a sandy beach.

A dangerous shorebank, with depths of less than 2m, extends 4 miles NE of Friendly Point. It shoals abruptly from the 10m curve. Treat Reef, which dries 1.2m, lies on the N edge of the shorebank, 2.7 miles NNE of Friendly Point.

From Friendly Point, the coast trends 4.5 miles NNW, then 8.5 miles N to **Bobardt Point** (13˚11'S., 143˚31'E.), a low sandy point, with wooded land between it and the coastal range 2 miles W. The coast here is backed by a continuous line of ranges between 274 and 458m high.

Voaden Point, 6.5 miles NNW of Friendly Point, is low and tree covered. A reef, which dries 0.6m, lies on the outer end of a spit of foul ground which extends 1 mile from the point.

Hangklip Peak, 412m high, lies 2.5 miles inland, 3 miles SW of Voaden Point.

An extensive area of foul ground lies within the 5m curve, NE, E, and SE of Bobardt Point.

Between Bobardt Point and Cape Direction, 20 miles N, the coast continues to be primarily sandy beaches separated by several rocky points. This part of the coast is backed by a line of coastal ranges. Chester Peak, 329m high, lies 3.5 miles NNW of Bobardt Point.

Cape Direction bearing 182˚, distant 8 miles

Cape Direction bearing 333˚, distant 5 miles

The 10m curve follows the coastal trend up to 3 miles offshore between Bobardt Point and **First Red Rocky Point** (13˚04'S., 143˚31'E.), 7.2 miles N; the water shoals quickly inside the 10m curve.

First Red Rocky Point is 23m high and has red cliffs. High Peak, 491m high, is a conical summit located 3 miles WNW of the point.

A dangerous shore bank, with depths of less than 1.8m, extends up to 3.2 miles offshore between First Red Rocky Point and Cape Direction. It lies just within the 5m curve, but the water shoals quickly within the 10m curve.

Wasp Reef (13˚02'S., 143˚33'E.), which dries 0.6m, lies on the edge of the coastal bank, 2.2 miles NNE of First Red Rocky Point.

Round Point, 47m high, lies 3 miles N of First Red Rocky Point and Second Red Rocky Point lies 3 miles farther N. Bare Hill, 82m high, lies 0.3 mile W of Second Red Rocky point. The shore bank extends 2.2 miles E of Second Red Rocky Point;the 10m curve lies 0.2 mile farther E.

From Second Red Rocky Point to Cape Direction, 7 miles N, the dangerous shore bank is encumbered with reefs and dangers.

8.58 Hammond Reef (12˚56'S., 143˚33'E.) lies on the coastal bank 2.2 miles NE of Second Red Rocky Point. Numerous reefs lie NW of Hammond Reef.

Rocky Islet, 39m high, lies 2.5 miles SSE of Cape Direction. Large boulders extend 0.1 mile E from the islet; the outer boulder is 6m high.

Cape Direction (12˚51'S., 143˚32'E.) is a remarkable headland terminating in a rocky point. There are several well-defined round, bare hills, covered with boulders on the cape.

Direction Hill, 146m high, the farthest S of these hills, appears as a sharp peak when seen from the N or S.

Off-lying Islands

8.59 There are numerous steep-to rocks, shoal patches, reefs, and islets between this part of the coast and the inner edge of the barrier reef. The 10m curve is so irregular off the coast between Claremont Point and Cape Sidmouth that it cannot be depended on to give adequate warning of impending danger. North of Cape Sidmouth to Cape Direction, most of the dangers are contained within the 20m curve which follows the coastal trend.

There are general depths of 12.8 to 27m in the fairway of the recommended track through this part of the Inner Route.

The Claremont Islands is a group of three islets, consisting of Burkitt Island, Hannah Island, and Wilkie Island, which lies near the Inner Route between 5.7 miles NE and 14 miles NNW, respectively, of Claremont Point.

Burkitt Islet (13˚56'S., 143˚45'E.), the farthest S of the group, is 17m high; it lies on the N end of a steep-to reef which dries. A dangerous wreck, best seen on the chart, lies 2 miles NW.

Simpson Rock, with a depth of 10m, lies 2 miles NNE of Burkitt Islet; Yule Rock, with a depth of 9.1m, lies 1 mile NW of Simpson Rock. Olver Rock, with a depth of 7.3m, lies 0.7 mile NW of Yule Rock.

8.60 Hannah Islet (13˚52'S., 143˚43'E.), 20m high, is fringed by a steep-to reef. It lies 8.5 miles NNE of Claremont Point, 0.6 mile E of the Inner Route. A light is situated on the NW extremity of the islet. The light is obscured SSE of Burkitt Island by trees between the bearings of 328˚ and 332˚.

Sullivan Shoal, a number of coral heads with a least depth of 3.6m, lies on the W side of the Inner Route, 1.7 miles NW of the light on Hannah Islet.

Helby Rock, a 6.8m coral pinnacle, lies 2.2 miles N of Sullivan Shoal.

Wilkie Islet, 14m high, is located on a drying reef, 6.7 miles NNW of Hannah Islet. Poulsen Rock, with a least depth of 7.3m, lies just inside the 10m curve, 2 miles NNW of Wilkie Islet.

8.61 Hay Island (13˚40'S., 143˚41'E.), 15m high, is a conspicuous wooded island lying 6 miles NNE of Wilkie Islet. A current rip sometimes extends from Hay Island to Fife Island, 1.5 miles NE. The Inner Route passes about midway between these two islands, or to the W of Hay Island.

Fife Island (13˚39'S., 143˚43'E.) lies on the W end of a steep-to reef, which dries 1.8m. A light is shown from the W end of the island.

Macdonald Reef (13˚33'S., 143˚39'E.), which dries 0.9m and is steep-to, lies 4 miles E of Campbell Point, and 7.2 miles NNW of Fife Island.

Heath Reef (13˚29'S., 143˚41'E.), a steep-to dangerous reef, is located on the E side of the Inner Route, 4.5 miles NNE Macdonald Reef. A light is situated on the reef.

Quake Reef, which dries 1.2m, lies 2 miles NW of Heath Reef.

South Khandalla Shoal, with a least depth of 5.2m, and North Khandalla Shoal, with a least depth of 3.6m, lie 2.2 and 2.7 miles NNE, respectively, of Heath Reef.

Bow Reef (13˚18'S., 143˚40'E.), marked by a light, dries 0.9m; it lies on the E side of the Inner Route, 7 miles NNW of North Khandalla Shoal.

Howard Rock, with a least depth of 8.2m, lies 2.5 miles NW of Bow Reef. Chilcott Rock, Lowrie Islet, and Norman Rock lie 0.7 mile NW, 1.7 miles WNW, and 2.2 miles WNW, respectively, of Howard Rock.

Parry Rock (13˚15'S., 143˚38'E.), a coral rock with a depth of 10.3m, lies 2 miles N of Howard Rock.

Binstead Islet, 6m high, lies 3.7 miles NW of Parry Rock.

Night Island (13˚10'S., 143˚34'E.), about 14m high, lies 1.5 miles N of Binstead Islet and 3 miles E of Bobardt Point. The island is fringed with a coral reef, which dries; the reef is steep-to on its E and W sides, but depths of less than 9.1m extend 0.3 mile from the S extremity and 0.4 mile from the N extremity, respectively. Tide rips occur over the latter depths, and also N of them. A small coral reef, awash, lies 0.4 mile NW of the N end of the island.

There is a clear passage, with depths of 7.3 to 11m, mud and shell, between Night Island and the outer reefs off Bobardt Point. There are no good marks and the passage should not be used without local knowledge except at LW, when the edges of the channel on both sides can be plainly seen.

Anchorage.—Anchorage may be obtained, in a depth of 11m, clay, in the N entrance to the channel. Tidal currents in the channel are not strong. Anchorage Area NI lies 0.5 miles W of the N most tip of Night Island.

Caution.—The shore bank extends about 2 to 3.5 miles offshore between Night Island and Cape Direction. Because of a strong W set of the current that may occur with strong E or SE winds, vessels must guard against drifting W of the recommended track in this vicinity.

8.62 **Waterwitch Reef** (13˚09'S., 143˚37'E.) dries 1.2m; it lies 2.5 miles NE of Night Island, and about 0.5 mile E of the recommended track. A light is shown from the reef.

Sykes Reef, 4 miles NW of Waterwitch Reef, dries 0.3m.

Stork Reef, which dries 1.8m, lies 2 miles N of Sykes Reef. The water is fouled by rocks 0.6 mile N of the reef and 0.4 mile S., respectively.

Dugdale Rock, a coral pinnacle which dries at LW, lies on the 20m curve, 2.2 miles NE of Stork Reef. This steep-to danger is located 0.9 mile W of the track through the Inner Route.

Chapman Islet (12˚53'S., 143˚36'E.), a sandy islet covered with bushes and trees, lies on the NE end of a reef, 8.5 miles NNE of Dugdale Rock. A light stands on the reef, 0.5 mile NW of the islet. Current rips occur N of the light when the wind is strong.

Ashton Rock, with a depth of 1.5m, lies 2 miles SW of Chapman Islet.

The Great Barrier Reef—Inner Edge—Iris Reef to Wye Reef

8.63 The inner edge of the Great Barrier Reef trends about 70 miles NNW from Iris Reef to Wye Reef, about 4.2 miles NE of Cape Direction. Vessels should keep W of a line connecting the reefs and dangers described below, which mark the inner edge of the Great Barrier Reef. Most of these dangers are steep-to on their W sides and have depths of 14.9m or more close off them.

Pelican Island (13˚55'S., 143˚50'E.) lies on the NW side of a steep-to reef, which dries 0.9 to 1.2m, 2.5 miles N of Iris Reef. Rocks, awash at HW, lie on the W side of the reef, S of the island.

Magpie Reef, an extensive shoal, lies with its W extremity 8 miles NNW of Pelican Island. A light is situated on a sand cay, on the W extremity of the reef.

Ballerina Shoal, with a depth of 9.5m, lies 3 miles SSE of Magpie Reef Light. Dayman Rock, steep-to, with a depth of 9.9m, lies 1.5 miles SW of Ballerina Shoal. Olver Rock, with a depth of 7.1m, lies 1 mile SW of Dayman Rock. Yule Rock, with a depth of 8.1m, lies 1 mile SE of Olver Rock.

Noddy Reef lies with its S extremity 4 miles NNE of the light on Magpie Reef. Foul ground extends W from the SW extremity of the reef to the 10m line, 0.5 mile W. Fife Island, previously described in paragraph 8.61, lies 5.5 miles NNW of Noddy Reef.

Ogilvie Reef lies with its W end 6 miles NNE of Fife Island Light. The W part of the reef, which dries 0.6 to 0.9m, is the only part which has been surveyed. A sand cay near the W end of the reef dries 1.8m.

8.64 **Morris Island** (13˚30'S., 143˚43'E.) lies near the middle of the W side of a reef which dries 1.8m, 3.7 miles N of the W end of Ogilvie Reef. Claremont Rock, with a depth of 7.6m, lies 1 mile SW of Morris Island.

Anchorage.—Anchorage can be taken, in 12.8 to 16.5m, mud and sand, about 0.5 mile NNW of Morris Island, but care must be taken to avoid Claremont Rock.

Blanchard Reef, which dries in patches, lies 3 miles NNE of Morris Island. Shoal patches and foul ground, with depths of less than 5m, lie within 0.5 mile of the W side of the island, and dangers with depths of 1.2 to 8.2m lie within 1 mile of the SW extremity of the same reef.

Drake Shoals (13˚26'S., 143˚42'E.) consists of a number of coral heads, with depths of 6.4m, lying 1 mile W of the W extremity of Blanchard Reef.

Ellis Reef dries 1.5 to 2.4m; it lies 1.7 miles W of the N extremity of Blanchard Reef. The reef is steep-to on its W side. A shoal, with a least depth of 7m, is charted 1.5 miles N of Ellis Reef.

Celebration Reef (13˚17'S., 143˚42'E.), which dries 1.2m, lies 4 miles N of Ellis Reef. The SW side of the reef is steep-to, but foul ground extends 0.5 mile off the N side. The Inner Route lies 1.6 miles W of the reef.

Throne Shoals, a mass of detached reefs, lies between 1.5 and 4 miles N of Celebration Reef, on the S side of the SW end of Second Three Mile Opening.

Gertrude Reef (13˚10'S., 143˚40'E.), which dries 0.6m, lies on the N side of the SW entrance to Second Three Mile Opening, 2.7 miles N of Throne Shoals. Foul ground extends 0.4 mile NE and WSW, respectively, from the reef.

Glennie Reef, which dries 1.3m, lies 1.2 miles WNW of Gertrude Reef. Foul ground, with a depth of 6.4m, extends 0.3 mile SW from the reef; depths of 10m extends 0.7 mile NW of the same reef.

8.65 New Reef (13˚06'S., 143˚39'E.), which is about 2 miles long on its W side, lies 1.5 miles N of Glennie Reef. A boulder, which dries 1.8m, lies at the S end of the reef. The W side of the reef is encumbered with several small drying reefs. A shoal patch, with a depth of 2.4m, is charted about 0.3 mile off the NW end of the reef.

Morris Rock is a steep-to knoll with a depth of 10.6m, and lies 1.2 miles NW of New Reef.

Osborne Reef (13˚03'S., 143˚38'E.), which dries 2.1m, lies 1.5 miles N of Morris Rock. A beacon stands on the S end of the reef.

The **Sherrard Islets** (12˚59'S., 143˚37'E.) lie on the N end of a reef, 3 miles N of the NW extremity of Osborne Reef. The Inner Route passes about 1 mile W of the W islet. A 4.3m coral patch lies 2 miles ESE of the E of the Sherrard Islets. A small drying reef and an 8.2m patch lie 0.5 mile N of the 4.3m patch.

Anchorage.—Vessels can anchor, in 24 to 26m, mud, 0.4 mile NW of the W Sherrard Islet.

Frederick Patches, a number of shoal heads with a least charted depth of 2.4m, lie 6 miles N of the Sherrard Islets. Chapman Islet, previously described in paragraph 8.62, lies 1 mile W of the patches.

Sunk Reef lies 1 mile N of Frederick Patches; only its W side has been surveyed. The W side of the reef is fringed by a narrow strip of drying sand. A depth of 4.2m is charted close off the NW extremity of the reef.

Wye Reef (12˚49'S., 143˚37'E.) dries 1.5m. A lighted beacon is situated on the N end of the reef. Shoals, with depths of less than 11m, extend 0.5 mile SE and 0.7 mile E, respectively, from Wye Reef.

The Great Barrier Reef—Outer Edge—Lowry Passage to Quoin Island Entrance

8.66 The outer edge of the Great Barrier Reef between **Rodda Reef** (13˚55'S., 144˚21'E.), on the NW side of Lowry Passage, and the entrance to First Three Mile Opening, 34 miles NW, is formed by a chain of drying reefs through which there are a number of small openings.

A rock, which dries 2m, lies on a small reef 10 miles NNW of Rodda Reef, and another rock, which dries 2.6m, lies on the SW side of a reef 6.7 miles farther NW.

Creech Reef (13˚38'S., 144˚06'E.), 6.2 miles NW of the rock above, which dries 2.6m, has a rock on its W extremity which dries 3m. Annchorage Area CR is situated just W of the westernmost tip of Creech Reef , in a depth of 23m.

First Three Mile Opening (13˚28'S., 144˚01'E.) is entered between a reef located 10 miles N of Creech Reef and a drying reef, which has an above-water sand cay on its NW end, 4 miles WNW. Below-water rocks lie in the opening 1.7 miles WNW of the reef on the S side of the opening. Depths of 9.1m lie 0.4 mile SSE and 0.3 mile NNW, respectively, of the below-water rocks. A charted depth of 7.2m lies on the N side of the channel.

Fairway Channel, which has not been fully examined, extends SSE along the W side of the outer edge of the Great Barrier Reef, from First Three Mile Opening to the W extremity of Rodda Reef, about 32 miles distant.

Tijou Reef (13˚10'S., 143˚57'E.), a long narrow drying reef, lies with its S end 8 miles NNW of First Three Mile Opening; its N end is 12 miles N and forms the E entrance point of Second Three Mile Opening. The outer side of Tijou Reef is dangerous to approach as the swell generally rolls in and breaks heavily on it.

Black Rock, which is always above water, lies 1.5 miles SW of the N extremity of Tijou Reef.

Second Three Mile Opening is entered at its NE end between the N end of Tijou Reef and **Ham Reef** (13˚02'S., 143˚52'E.), 4.7 miles WNW. Franklin Reef, which dries 1.2m, lies in the middle of the entrance.

Between Black Rock and Franklin Reef there is a small drying reef, and several shoals with depths of less than 5.5m.

Wilsen Shoal, with a depth of 2.3m, lies 0.5 mile S of Ham Reef; a depth of 10.2m lies 0.5 mile SE of Wilsen Reef.

8.67 Jubilee Reef (13˚10'S., 143˚46'E.), which dries 0.3m, lies on the S side of Second Three Mile Opening, 9 miles WSW of Franklin Reef.

Dart Shoal, with a depth of 1.9m, lies in the middle of the opening 2 miles NW of Jubilee Reef.

Diamond Reign Reefs are a continuation NE of Throne Shoals. They consist of numerous detached reefs which have some patches that dry 0.9m, and are joined to Jubilee Reef ENE.

Colclough Reef (13˚05'S., 143˚44'E.), which dries 1.2m, lies on the N side of Second Three Mile Opening, 7 miles WSW of Ham Reef.

Gertrude Reef, previously described in paragraph 8.64, lies on the N side of the opening, 5 miles SW of Colclough Reef.

The seaward entrance to Second Three Mile Opening, from the N, is easily made out as Cape Direction is readily identified from 5 miles outside the Great Barrier Reef. Hangklip Peak, bearing 237˚, is an excellent steering mark for clearing the reefs in the entrance in a least depth of 10.2m, but Dart Shoal lies on this same bearing farther SW.

Between Second Three Mile Opening and Quoin Island Entrance, 40 miles N, the outer edge of the Great Barrier Reef is formed by a chain of narrow, drying reefs.

Derry Reef (13˚01'S., 143˚51'E.), separated from Ham Reef by a deep channel 0.5 mile wide, dries 1.2m. A sand cay lies on its NW side. A sandbank lies at the NW extremity of the reef that forms the S side of Bligh Boat Entrance, 10.5 miles N of Derry Reef.

Bligh Boat Entrance lies between the sandbank and Bligh Reef 0.2 mile N.

Hibernia Entrance is about 0.2 mile wide and lies 7.2 miles N of Bligh Boat Entrance. Its seaward entrance lies 17 miles ENE of Cape Direction.

8.68 Providential Channel (12˚36'S., 143˚49'E.) lies 7.2 miles N of Hibernia Entrance. A below-water rock lies nearly in the middle of the entrance.

Southern Small Detached Reef, which breaks heavily, lies 2.5 miles NE of the entrance to Providential Channel.

Northern Small Detached Reef (12˚25'S., 143˚49'E.), which also breaks heavily, lies 9 miles N of Southern Small Detached Reef. The reef dries in patches.

Quoin Island Entrance lies 4 miles W of Northern Small Detached Reef and is entered between a drying reef on the S side and Lagoon Reef on the N side; it is 0.4 mile wide, with depths of 56 to 79m.

When approaching from seaward, it is best to identify Northern Small Detached Reef and pass N of it; the entrance will be seen bearing 277˚ and vessels should steer a mid-channel course to the clear water W of the reefs.

Vessels having cleared the entrance may proceed SW and pass S of the small detached reef that lies 4 miles E of Eel Reef, then WSW to pass mid-way between Eel Reef and Dolphin Reef, 1.7 miles S. When clear of Dolphin Reef, steer as required to the Inner Route.

Caution.—The areas to the N and S of the line of soundings from Quoin Island Entrance to Dolphin Reef have not been thoroughly examined.

Cape Direction to Cape Grenville

8.69 The coast between Cape Direction and Cape Grenville, about 55 miles NNW, is indented by three bays which are separated by prominent capes. Much of this coast consists of sandy beaches and low mangrove shores, with an occasional small river or creek flowing through them.

Tides—Currents.—The current has been found to set N along the E side of Lansdown Reef during SE gales at a rate of 2 to 3 knots, but its normal rate during the Southeast Trades is 0.5 to 1.2 knots. North of Lansdown Reef, the current sets more into Lloyd Bay.

In the vicinity of the Piper Islands, the surface current always sets NW during the Southeast Trades when the wind is strong. When the wind is light during the falling tide, the current may sometimes cease or even flow SE.

During the Northwest Monsoon, the wind-driven current in the vicinity of the Piper Islands sets mostly SE or with the varying direction of wind. At springs, the flood current setting NW usually predominates over the wind-driven current. At neaps, the SE set of the wind-driven current prevails and attains a maximum rate of about 0.5 knot about the time of LW; the minimum rate occurs about the time of HW.

Lloyd Bay is a deep indentation in the coast between Cape Direction and Cape Weymouth, 15 miles NNW. Except for Edwards Shoals, all dangers in the bay are contained within to 10m line.

The S side of Lloyd Bay trends 11 miles W from Cape Direction to the head of the bay and consists mostly of a low mangroved shore.

Orchid Point (12˚51'S., 143˚27'E.), which is bold, lies on the S side of the bay, 5.5 miles W of Cape Direction. Orchid Hill rises to a 123m summit about 0.7 miles S of the point.

The W side of Lloyd Bay trends about 15 miles NNE from its head to Cape Weymouth and consists mostly of sandy beaches. Several scattered hills, nearly 123m high, lie 0.5 to 2 miles inland in the S part of the W side. The N half of the W shore is closely backed by sandhills and ridges, and attains a height of 121m at Red Hill, 0.4 mile SW of Cape Griffith.

8.70 Cape Griffith (12˚41'S., 143˚25'E.), a bold rocky headland, lies on the W side of Lloyd Bay, 12.5 miles NW of Cape Direction; a rock, 2m high, lies less than 0.2 mile SE of the cape.

Albatross Cove lies on the N side of Cape Griffith; a drying sandbank, fringed with coral, extends nearly 0.5 mile from the W side of the cove and continues NNE nearly to Cape Weymouth, 3.7 miles N of Cape Griffith.

Caution.—The dangers in the SE part of Lloyd Bay consist of a number of steep-to reefs, which partly dry, and several banks and rocks, whose positions may be seen on the chart.

Lansdown Reef (12˚49'S., 143˚33'E.), with a charted depth of 1.8m, lies on the edge of the 10m curve, 2 miles NNW of Cape Direction. A depth of 2.7m lies 1 mile NNW of Lansdown Reef; it is steep-to on its N and E sides. A 1.8m shoal lies charted near the 10m curve, 1.5 miles NE of Cape Direction. Tide rips occur close N of the 2.7m depth, N of Lansdown Reef.

Hazelgrove Reefs, three detached reefs which dry 0.9m, lie on the 10m curve, 5.5 miles NNW of Cape Direction.

Edwards Shoals consists of two patches 2 miles NE of Cape Griffith. There is a depth of 1.5m over the S patch; the N patch is awash.

8.71 Restoration Rock (12˚37'S., 143˚28'E.) lies 1.5 miles E of Cape Weymouth and is 33m high. The rock is steep-to except on its N and NE sides, where foul ground extends a short distance offshore. A light is shown from the summit of the rock. Tide rips occur between 0.2 and 0.5 mile N of the rock.

Cape Weymouth (12˚37'S., 143˚26'E.) is a prominent headland, with a double summit, 55m high. The land W of the cape is low.

Weymouth Bay lies between Cape Weymouth and Fair Cape, 15.5 miles NW. Its S part is fringed by drying reefs for a distance of 9 miles NW of Cape Weymouth, then by a narrow drying sand bank about 2.7 miles N. The dangers fringing this part of the coast are contained within the 5m curve which follows the coastal trend from 0.2 to 1 mile offshore.

Aylen Hills, 119m high, rise 1.7 miles NW of Cape Weymouth. These hills appear as an island when seen from N or S.

Rocky Islet (12˚35'S., 143˚25'E.), 33m high, lies 2 miles NW of Cape Weymouth. It is steep-to, but foul ground lies off the SE side. There are tide rips N of the islet.

Anchorage.—Portland Road lies in a small bight that indents the coast 0.5 mile W of Rocky Islet. During SE winds, small vessels can take anchorage in the road 0.6 mile W of Rocky Islet, in 8m, mud.

The flood current sets SW across the E end of Portland Road at a rate of less than 1 knot, and the ebb, which is weak, sets in the opposite direction.

Round Back Hills rise from the coast, 2.5 miles W of Portland Road, to a height of 350m; when seen from a distance, they appear as an island.

Kennedy Hill, 10 miles NNW of Round Back Hills, rises abruptly from the coast to a height of 439m. Stanley Hill, 354m high, rises 0.5 mile inland, 1.5 miles NNE of Kennedy Hill.

A shorebank, with depths of less than 0.3m, extends 1 mile offshore, E of Stanley Hill.

Fair Cape (12˚24'S., 143˚16'E.), a rocky point, rises abruptly to a height of 148m and is closely backed by hills, 305m high, that are a continuation N of the hills backing the W side of Weymouth Bay.

Caution.—Most of the dangers between this part of the coast and the inner edge of the barrier reef lie on the W side of the Inner Route.

Middle Reef (12˚31'S., 143˚23'E.) is a narrow, coral ridge, which dries 1.8m, lying 6 miles NNW of Cape Weymouth. A depth of 4.9m is lies off the N end of the reef; the Inner Route lies 1.2 miles E of the light on the S end of the reef.

Blue Bell Rocks consist of two pinnacles which lie 1 mile W of Middle Reef. The N rock dries and the S has a depth of 2.1m.

Kemp Rocks (12˚26'S., 143˚22'E.) are two steep-to pinnacle rocks, with a depth of 6.1m, that lie close inside the 20m curve, 4.5 miles NNW of Middle Reef.

8.72 From Fair Cape, the coast trends WNW about 11 miles, then 5 miles N to Bolt Head. Cape Grenville lies 19 miles NNE of Bolt Head. Temple Bay occupies the bight formed between Fair Cape and Cape Grenville.

The dangers contained within the 10m curve, which lies up to 5 miles off the SW extremity of Temple Bay, are charted and are not discussed here.

Kangaroo Shoals extends 1 mile E of Fair Cape and terminates in a spit 2 miles N of the cape. There are patches on the outer edge of the shoals with depths of 0.4 to 1.2m; the edge of the bank is steep-to.

First Stony Point (12˚23'S., 143˚15'E.), with rocks which dry 2.4m close off it, lies 2 miles NW of Fair Cape. Second Stony Point and Mosquito Point lie 2.2 and 4.5 miles NW, respectively, of First Stony Point. Drying coral reefs and mud flats fringe most of this section of coast to 0.5 mile offshore.

From Mosquito Point to the head of Temple Bay, 6 miles W, the coast is low, with mangroves extending 3.5 miles inland, and fronted by a mud bank 0.5 mile offshore.

From the head of Temple Bay, a sandy beach backed by low land extends 5 miles N to **Bolt Head** (12˚15'S., 143˚06'E.), an inconspicuous cliffy head that has a hill, 70m high, 0.8 mile W of it.

A red cliff lies 2 miles N of Bolt Head; from the cliff the coast trends about 16 miles NNE to Cape Grenville. A ridge of low hills backs this shore to a position about 5 miles S of Cape Grenville. From this position to the cape the shore is low and swampy.

Caution.—Piper Reef (12˚15'S., 143˚14'E.) consists of two reefs. The largest and farthest E of the two reefs lies 9.5 miles NNW of Fair Cape; it dries 1.8m. A light is shown from the E reef and the Inner Route passes 0.5 mile E of the light.

The Piper Islands are four small islets located on Piper Reef. Fisher Islet, the largest of the islets, is 14m high. It lies on the reef, 0.7 mile SW of the light. Anchorage Area PIN is situated just S of a line drawn between Baird and Farmer Islands. Anchorage Area PIS is situated 0.25 miles N of Farmer Island.

Young Reef (12˚08'S., 143˚13'E.), which dries and is steep-to, lies 8 miles NNW of the light on Piper Reef, and 1.2 miles W of the recommended Inner Route. A beacon is situated on the N extremity of the reef.

Cape Grenville (11˚58'S., 143˚14'E.) is described in paragraph 8.77.

The Great Barrier Reef—Inner Edge—Wye Reef to Queue Reef

8.73 **T**he inner edge of the Great Barrier Reef trends about 40 miles NNW from Wye Reef to the N end of Inset Reef. It then trends N about 9 miles to Moody Reef, and then about 11 miles NE to Queue Reef, 7.5 miles NE of Cape Grenville. Vessels should keep W of a line connecting the following reefs, which are the dangers on the inner edge of the Great Barrier Reef.

Zenith Reef (12˚46'S., 143˚36'E.) dries 0.9m. A sand cay, which dries 2.4m, lies on the N end of the reef. The reef lies 5.7 miles NE of Cape Direction. Halloran Rock, with a depth of 14m, lies about 1.2 miles SSW of Zenith Reef and 1 mile NNW of Wye Reef.

Ape Reef, parts of which dry 1.5m, lies 3.5 mile NNW of Zenith Reef. Boulders, which dry, lie on the S end of the reef and a sand cay, which dries, lies on the NW end.

Tannadice Rock (12˚40'S., 143˚31'E.), with a depth of 1.8m, and Tannadice Shoal, with a depth of 7.3m, lie 3.7 and 3.2 miles NW, respectively, of Ape Reef.

Burke Reef, an elongated U-shaped series of reefs, drying between 0.6m and 0.9m, with many large drying boulders, lies 1.5 miles NE of Tannadice Rock. The shallow bay formed by the E and W extremities of the reef has not been examined but contains numerous isolated coral heads. Foul ground extends nearly 0.5 mile N of the line joining the N ends of the reef. There is a clear passage, about 1.2 miles wide, with depths of 33 to 38m, between Burke Reef and Curd Reef, allowing access to Quoin Island Entrance or Black Rock Entrance.

Caroline Rock (12˚39'S., 143˚32'E.), which dries 0.3m, is the outermost of the foul ground which extends 0.5 mile W of Burke Reef.

Curd Reef lies 2.2 miles NNW of Burke Reef, about 3.2 miles ENE of the light on Restoration Rock; it dries 0.9m. A sand cay on the N extremity of the reef dries 2.7m. Curd Reef, a series of drying reefs, extends 1.7 miles ESE from the sand cay and then 1 mile E. Unexamined foul ground, about 2 miles wide, extends 4.7 miles ENE from the same cay.

8.74 **Dolphin Reef** (12˚34'S., 143˚31'E.), a group of rocky heads with a least depth of 0.1m, lies 1 mile N of Curd Reef. Isolated shoals lie 4 miles ENE of the W extremity of the reef. The channel between Dolphin Reef and Eel Reef, 2 miles N, appears to be clear over a width of 1.5 miles. This passage is the W entrance of Quoin Island Entrance.

Eel Reef (12˚30'S., 143˚26'E.) extends 11 miles NNW from a position 2 miles N of Dolphin Reef. A light is situated near

the N extremity of the reef, about 5.5 miles ESE of Fair Cape. The S edge of the reef has been examined only for a distance of about 3.5 miles NE and appears to be steep-to. The SW edge of the reef partly dries at springs but the reef is always visible when the light is good.

Quoin Island, 18m high, lies on the unsurveyed part of the barrier reef, 7 miles E of the light on the N end of Eel Reef.

Gallon Reef lies with its SW end 2 miles NE of Eel Reef Light; the W side of the reef extends 9 miles NNW from this position; parts of this reef dry.

The Forbes Islands lie about 3 miles NE of the center of the W side of Gallon Reef. The islands, which are up to 88m high, are prominent from the S and appear as several hummocks.

Hazel Reef (12˚16'S., 143˚18'E.), a steep-to reef which dries 1.5m, lies 2 miles SW of the NW end of Gallon Reef. The Inner Route lies 1 mile W of Hazel Reef.

Inset Reef (12˚15'S., 143˚16'E.), which shows a light, lies 0.7 mile NW of Hazel Reef. A group of rocks, which dry 2.4m, lie on the S end of this steep-to reef, and a sand cay, which dries 1.5m, lies on the N end. The Inner Route passes about mid-way between Piper Reef and Inset Reef.

Kay Reef is a reef, which dries 1 to 2m, whose N extremity lies 1 mile N of Inset Reef. Kay Islet, 1m high, is located on the NW extremity of Kay Reef.

Laurel Reef, which dries and is steep-to, has a sand cay on its NW end which dries 1.2m.

Moody Reef (12˚05'S., 143˚16'E.) lies about 0.7 mile N of Laurel Reef and about 6 miles SSE of Cape Grenville. A sand cay, which dries 1.7m, lies on the NW end of the reef. A light is shown from the sand cay.

Haggerstone Island, 78m high, lies on the S end of a drying reef, 3.2 miles NNE of the light on Moody Reef. Rocks, 2.8m high, lie on the drying reef, about 1 mile N of Haggerstone Island.

Queue Reef (11˚56'S., 143˚22'E.), which dries 2.4m, lies 7 miles NNE of the N end of the reef on which Haggerstone Reef lies. Foul ground extends 7 miles NE from Queue Reef along the S side of Pollard Channel.

The Great Barrier Reef—Quoin Island Entrance to Raine Island Entrance

8.75 The outer edge of the Great Barrier Reef trends NE for 15 miles from Lagoon Reef, on the N side of Quoin Island Entrance, to Black Rocks, which lie on the N extremity of an extensive reef. Black Rocks marks the S entrance point to Wreck Bay. The Great Barrier Reef, which forms the N entrance point of Wreck Bay, lies 6 miles NNE of Black Rocks. From this point the Great Barrier Reef extends N about 27 miles to Raine Island Entrance.

Yule Detached Reef and Great Detached Reef lie off the barrier reef, which is only about 1 mile wide in places. There are several openings through the reef in this area.

Wreck Bay (12˚08'S., 143˚52'E.) is formed by a circular bight in the outer edge of the Great Barrier Reef; it is entered between **Black Rocks** (12˚12'S., 143˚55'E.) and the S extremity of a reef 6 miles NNE and extends 9.5 miles W. A broken line of drying reefs forms the N and W sides of the bay, with the S side consisting of isolated drying reefs and a number of below-water patches There are general depths of 30 to 35m and greater across the S part of the bay and off the reefs bordering its W and N sides.

Black Rock Entrance is the farthest S of three passages through the reef on the W side of Wreck Bay.

Directions for Black Rock Entrance.—Vessels should enter Wreck Bay on a W heading and, when Black Rocks bear 146˚, 2 miles distant, steer 224˚. When 2 miles NNW of Lagoon Reef, steer a course of 213˚ and follow the directions for Quoin Island Entrance in paragraph 8.68. Vessels are cautioned to keep a good lookout as there are several reefs and dangers in this area.

Safe Entrance is a passage through the barrier reefs on the W side of Wreck Bay, 8 miles W of Black Rocks. It leads to apparent deep water on the W side of the barrier. It should be noted that the waters between the inner and outer ranges of the Great Barrier Reef have not been adequately surveyed and uncharted dangers may exist.

Nimrod Passage lies in the NW part of Wreck Bay, 10.5 miles NW of Black Rocks. This opening is about 0.3 mile wide.

Off the N entrance of Wreck Bay there is, at times, a heavy confused swell.

From the reef forming the N side of Wreck Bay, the outer edge of the barrier trends 3.5 miles N and then 3 miles NW to Single Rock Entrance.

Single Rock Entrance (12˚01'S., 143˚56'E.), a safe opening 0.3 mile wide, may be identified by a black rock on its SE side.

From the N side of the entrance to Single Rock Passage, a chain of small reefs trends about 9 miles NW to Stead Passage.

Yule Detached Reef (11˚58'S., 143˚58'E.), which dries and is steep-to, lies 3 miles NE of Single Rock Entrance.

Stead Passage is 0.3 mile wide and is difficult to make out, as it lies at the head of a bight in the barrier reef.

For a distance of 3 miles N of Stead Passage, the barrier reef is intersected by two or three narrow openings through Five Reefs.

Between Five Reefs and Small Opening, 6 miles NNE, the reefs are narrow and dry, with the sea nearly always breaking over them.

Three Reefs, on the N side of Small Opening, dry, and a spit with depths of less than 5.5m extends 0.2 mile N of them.

8.76 **Great Detached Reef** (11˚45'S., 144˚00'E.) lies with its SW extremity 4.5 miles SE of Three Reefs. A detached drying reef lies close off its SW extremity. The W side of the reef, for a distance of 6 miles N of the SW extremity, is formed by a below-water reef, with a small drying reef on its N end. Elsewhere, the reef consists of a continuously drying reef. There are several drying rocks on the E side of the reef. There are five openings through the reef; two on the SW side, 2 miles E and 2.2 miles SE, respectively, of the SW extremity, which have not been examined. There are two narrow safe channels on the N side, the widest one being to the NW side of the reef.

Anchorage.—Anchorage may be taken within the NW entrance to Great Detached Reef, in depths of 33 to 37m, in the N part.

Raine Island (11˚36'S., 144˚01'E.), 3m high, lies in the middle of the opening between Great Detached Reef and the projecting point of the Great Barrier Reef, 8 miles NE. A fring-

ing reef surrounds the island, except at its SE end where it extends 1.2 miles SE. A round stone tower stands on the E end of the island and is a good landmark.

Raine Island Entrance may be entered with local knowledge by passing either N or S of Raine Island, however, the S side is preferred. This entrance and Blackwood Channel, within the barrier, are no longer used and only small vessels with local knowledge should attempt them.

Cape Grenville to Cape York

8.77 Cape Grenville (11˚58'S., 143˚14'E.) is a peninsula connected to the mainland by a low isthmus. The cape rises to a height of 75m at the summit of Highgate Hill.

The **Home Islands** (11˚59'S., 143˚17'E.) are a group of seven islands which lie within 2.5 miles of Cape Grenville; each island lies on a reef.

Clerke Island, the farthest E of the Home Islands, lies nearest the recommended Inner Route. The island lies 2.5 miles E of Cape Grenville on a drying reef which extends 0.5 mile N of the island. A light is shown close off the SE extremity of the island.

The position of the other islands of the group may best be seen on the chart.

Tidal currents set obliquely across the Inner Route between the Home Islands and Haggerstone Island, 3 miles SSE.

The coast between Cape Grenville and Cape York, about 87 miles NNW, trends fairly regularly in that direction, except that a large bight recedes 15 miles SW between Cape Grenville and False Orford Ness, about 40 miles NNW. Most of the coast consists of sandy beaches separated by rocky points. Except for the SW sides of Shelburne Bay and Newcastle Bay, where low mangrove shores are backed by low land, most of the coast is closely backed by hills, ridges of hills, and sand hills that rise abruptly from the sea to heights of 15 to 152m. A few rivers and numerous small streams empty into the sea from this coast. There are no towns or ports on this part of the coast.

Most of the dangers fringing the coast are contained within the 10m curve, which follows the coastal trend about 0.5 to 2.7 miles offshore, except that it lies about 8 miles offshore at Shelburne Bay, about 5.5 miles offshore at Bushy Islet, and about 11.5 miles off the head of Newcastle Bay.

Caution.—Shelburne Bay and the waters immediately N of it, as far as the Hannibal Islands, have not been completely surveyed inside a line from Round Point to the Bird Islands and then to the Hannibal Islands. Vessels are advised to keep E of the above limits.

8.78 Margaret Bay lies between a point 2 miles WNW of Cape Grenville and **Thorpe Point** (11˚55'S., 143˚09'E.), 4.5 miles farther NW.

Sunday Island, 36m high, lies off the entrance off Margaret Bay, 1.5 miles N of the E entrance point, and is reef-fringed on its N and S side.

Anchorage.—Vessels may anchor, in 12m, 1 mile W of Sunday Island.

Round Point, 3 miles NW of Thorpe Point, is the SE entrance point of Shelburne Bay. The 10m curve lies 1 mile N of the point. A dangerous submerged rock lies about 0.7 mile NE of the point.

Conical Hill, 69m high, rises 2 miles SE of Round Point.

Shelburne Bay indents the coast about 6 miles SW between Round Point and the coast at Messum Hill, 86m high, about 17 miles NW.

The bay is only partly surveyed and vessels are advised to keep outside the 20m curve.

Hunter Point (11˚30'S., 142˚50'E.), 14 miles N of Messum Hill, rises to a height of 88m at the summit of Hunter Hill, 0.8 mile NW.

False Orford Ness, 13m high, is a hilly point 7 miles NNE of Hunter Point. A reef extends about 0.3 mile E off the point.

Hunter Reefs lie just inside the 15m curve, 2.5 miles SE of Hunter Point.

Between False Orford Ness and Sharp Point, about 27 miles NNW, the coast consists of numerous small bights separated by rocky points. This section of the coast is backed by a range of mostly barren hills that rise abruptly from the sea. Much of the N coast is cliffy. The 10m curve lies up to 5 miles offshore.

Orford Ness, a sandy point, lies 6 miles NNW of False Orford Ness. The coast between them is fronted by a shorebank, with depths of less than 5.5m, that extends up to 1 mile offshore.

Orford Bay, a shallow exposed bay, is a small indentation on the N side of Orford Ness.

8.79 Ussher Point (11˚10'S., 142˚48'E.) lies 8 miles N of Orford Ness. Some well-defined red cliffs of moderate height lie 0.5 mile S of the point. Left Hill, 115m high, rise 1.5 miles SW of the same point.

Cliffs, flat-topped and reddish in color, rise abruptly from the sea along most of the coast from Ussher Point to Shadwell Point, 10 miles N.

Sharp Point (10˚58'S., 142˚43'E.), which rises sharply to the 37m summit of Sharp Peak, lies 2.7 miles NNW of Shadwell Point.

Caution.—The coast from Orford Ness N should be approached with care, especially during the SE trades to which it is exposed.

Turtle Head Island lies 0.7 mile NW of Sharp Point. The Escape River empties into the sea between Sharp Point and Turtle Head Island. The river entrance is fronted by a bar with a least charted depth of 1.8m, and lies up to 1.7 miles offshore

Newcastle Bay indents the coast 8.5 miles SW, between Turtle Head Island and Fly Point, 10 miles NNW. The bay is shallow and encumbered with numerous detached banks and shoals, which may best be seen on the chart. These dangers are contained within the 10m curve, including those extending SE from Fly Point.

8.80 Fly Point (10˚45'S., 142˚36'E.), 6m high, is black and rocky. There are some large anthills composed of red clay and sand on the bare land within the point.

Between Fly Point and Cape York, about 6 miles NW, the coast is indented by numerous small bights.

Albany Island, about 3 miles long, lies parallel to the coast with its SE end 1 mile E of Fly Point. The island rises to a height of 90m at its N end.

Albany Pass lies between the SW side of Albany Island and the coast NW of Fly Point. The pass has depths of 11 to 26m,

but there is a shoal with a depth of 9.4m in the middle of the channel, 0.6 mile S of the NW extremity of Albany Island. At its NW end, the pass is obstructed by a bar, with depths of less than 10m, which extends from Frederick Point to **Eborac Island** (10˚41'S., 142˚32'E.). The significant depth on this bar is a 6.7m patch 0.5 mile NE of Ida Island. Vessels of more than 7m draft should not attempt to use this channel.

Cape York (10˚41'S., 142˚32'E.), the N extremity of Australia, lies on the W side of the N entrance of Adolphus Channel. Mount Bremer, 113m high, is a prominent peaked summit located 0.7 mile SSE of the extremity of Cape York. Cape York has been reported to give good radar returns up to 18 miles.

Eborac Island, 0.3 mile N of Cape York, is 34m high. A light is shown from the summit of the island. York Island, close W of Eborac Island, rises to a conspicuous peak, 84m high.

Off-lying Islands and Dangers

8.81 **Paluma Shoal** (11˚55'S., 143˚18'E.), a detached 4m patch, lies 3.2 miles NNE of Clerke Island Light. It is located about 1.5 miles E of the track through the Inner Route.

The Bird Islands lie on two drying reefs, which are always visible, 6 miles N of Round Point. The N reef, which is nearest to the Inner Route, lies on the edge of the 20m curve.

The Macarthur Islands, a number of small islands connected by sand cays, lie 5.5 miles WNW of the Bird Islands.

The **Hannibal Islands** (11˚35'S., 142˚57'E.), consisting of two low, wooded islands, are located on a steep-to reef, 8.5 miles NNW of thr Macarthur Islands. A light is shown from the easternmost of the two islands. The track through the Inner Route leads 0.7 mile NE of the light.

Pirie Islet, 11m high, lies on the E side of a reef, 2.5 miles WNW of the light on the Hannibal Islands.

Pearn Rock (11˚25'S., 142˚56'E.), 10 miles N of the Hannibal Islands, has a charted depth of 3m. The rock is steep-to and located 1.5 miles E of the Inner Route.

Halfway Islet lies on the NE side of a steep-to reef, 3 miles NNE of Pearn Rock. The coral reef dries and is always visible.

8.82 The **Cairncross Islets** (11˚15'S., 142˚56'E.) are several wooded islets that lie on a drying reef, 8.5 miles NNW of Halfway Islet. The W islet is 18m high and shows a light.

Bushy Islet, 5m high, lies 2.7 miles WSW of Cairncross Islets Light. The Inner Route passes about midway between these two points.

Gilmour Bank lies 2 miles ESE of Ussher Point, and about 5.5 miles NNW of Bushy Islet. The reef, which dries 0.6m, is difficult to see when it is covered.

Shortland Reef lies on the edge of the 20m curve, 15 miles NNW of Gilmour Bank. The reef dries and is always visible.

Wyborn Reef (10˚49'S., 142˚45'E.), 3 miles N of Shortland Reef, dries and is always visible. Shoal ground, with depths of less than 10m, extends 1.5 miles NW from the reef. A 15.5m shoal patch, lies on the recommended track, 2.7 miles NW of the N end of Wyborn Reef. A light is shown on the E side of the reef, 1.5 miles N of its S extremity.

The Great Barrier Reef—Inner Edge—Queue Reef to South Ledge

8.83 The inner edge of the Great Barrier Reef trends about 30 miles NW from Queue Reef to Viking Reef and then about 20 miles NNW to the Cairncross Islets. It then trends 26 miles N to an unnamed reef, which lies 8.7 miles E of Wyborn Reef, and then 10 miles NW to South Ledge.

Vessels should keep SW and W of a line connecting the following reefs and islets which are dangers on the inner side of the Great Barrier Reef. The S and W sides of these reefs are steep-to.

Cockburn Reef (11˚50'S., 143˚19'E.) lies with its SW extremity 3.5 miles NW of Queue Reef. The reef extends 11 miles ENE and 8.5 miles NNW, respectively, from its SW extremity.

The Cockburn Islets are a group of islets that lie near the middle of Cockburn Reef. Pig Islet, the farthest N of the group is, 30m high.

Erlangen Patch, with a depth of 1.8m, and Cockburn Patch, with a depth of 2.2m, lie 1.2 and 1.7 miles NW, respectively, of Queue Reef.

Magra Islet lies on the N end of a reef, close off the W side of Cockburn Reef.

Guthray Reef lies close off the W side of Cockburn Reef, 2.7 miles N of Magra Islet; the reef dries.

Chimmo Shoal (11˚48'S., 143˚15'E.), with a least depth of 1.4m, lies 1 mile W of Guthray Reef.

Fairway Reef, awash, lies 2.5 miles WNW of the N extremity of Cockburn Reef.

Thrush Reef (11˚43'S., 143˚11'E.) lies 2.5 miles NW of Fairway Reef. Saunders Islet lies on the N end of this drying reef.

8.84 **Viking Reef** (11˚36'S., 143˚00'E.), 11 miles NW of Saunders Islet, dries and is always visible.

Wizard Reef, which dries and is always visible, lies 1 mile N of Viking Reef.

Boydong Cays (11˚28'S., 143˚01'E.) consists of several islets and sand banks which lie between 1.2 and 5.5 miles NNE of Viking Reef. Anchorage Area BC lies 0.5 miles N of Boydong Island.

Pearn Rock, 7.2 miles NNW of Wizard Reef, and Halfway Islet, 3.2 miles NE of Pearn Rock, have previously been described in paragraph 8.81.

The East Islets consists of Jardine Islet, 9 miles N of Wizard Reef and Cholmondley Islet, 1.5 miles ENE of Jardine Islet. Vessels are advised to keep W of Halfway Islet, which lies 3.5 miles E of Jardine Islet.

Douglas Islet lies on the NW end of a drying reef which is usually visible. The islet lies 8.7 miles NNW of Jardine Islet; there is a clump of prominent trees on the islet.

Milman Islet (11˚10'S., 143˚01'E.) lies on the NW end of a reef which dries, 4.2 miles NNE of Douglas Islet.

A reef which dries 0.3m, lies 2.2 miles NNW of Milman Islet.

Sinclair Islet, 1.2m high, lies on the NW end of a drying reef, 3.5 miles N of Milman Island.

Arnold Islet (11˚01'S., 142˚59'E.), 4m high and wooded, lies in the middle of a drying reef, which is always visible, 6.2 miles NNW of Sinclair Islet.

A reef (10˚49'S., 142˚55'E.), which dries 1.2m, lies 12.5 miles NNW of Arnold Islet; about 2.7 miles E of this reef is another reef with a small sand bank on its N end.

South Ledge (10˚43'S., 142˚44'E.) is an extensive reef that lies with its E end 9.7 miles WNW of the small reef above. Tetley Islet, 2.4m high, lies on the S side of the reef, 3 miles from its E end.

Many reefs lie between South Ledge and the outer edge of the barrier reefs, about 70 miles to the E. The area is unsurveyed and is considered dangerous to navigation.

The Great Barrier Reef—Raine Island Entrance to Anchor Cay

8.85 From Raine Island Entrance, the barrier reef trends in a general N direction about 136 miles to East Cay, then 5 miles WNW to Anchor Cay. The reefs appear to be almost continuous, but they are broken with several passes through the reef.

From the N entrance point of Raine Island Entrance, the outer edge of the barrier reef trends about 7 miles NNW, terminating in a sandbank, 2m high. This sandbank (11˚26'S., 144˚00'E.) forms the SE side of Pandora Entrance.

Pandora Entrance is about 2.2 miles wide and has depths of 20 to 73m. Several drying reefs extend across the channel from the N side, 2 miles within the entrance. A clear passage, about 1 mile wide, leads through these reefs.

Between Pandora Entrance and Olinda Entrance, 12.5 miles NNE, the outer edge of the barrier reef consists of a number of detached reefs overlapping each other, and from the offing appear as a continuous line of reefs.

Olinda Entrance is 1 mile wide and is well-marked by the continuous reef N of it, but it has not been examined and is not recommended due to the shoals within the entrance.

Triangle Reef (10˚45'S., 143˚57'E.), so named from its shape, lies 30 miles NNW of Olinda Entrance at the end of the continuous reef.

Yule Entrance (10˚23'S., 143˚55'E.) lies 21 miles N of Triangle Reef. The intervening barrier reef is formed by a chain of detached reefs, which, from the offing, appear as an unbroken line.

Yule Entrance is about 1 mile wide and has a small reef, which breaks, lying nearly in mid-channel. The entrance is dangerous and is not recommended. The flood current at springs has been known to attain a rate of 5 knots.

8.86 Flinders Entrance (9˚38'S., 144˚14'E.) lies between the extremities of the reefs 46 miles NNE of Yule Entrance, and detached drying reefs, 7.5 miles NNW, on the E end of which is Don Cay. Foul ground extends 2.5 miles N from the S entrance point, with depths of 3.7 to 5.5m extending 2.5 miles farther. In 1973, a reef was reported 3.5 miles ENE of Don Cay; there is an extensive shoal, with a depth of 9.1m, between 6 and 8.5 miles ENE of Don Cay. Other dangers may exist in the entrance.

Flinders Entrance does not lead to any direct route through Torres Strait and is only recommended as the best approach to the Murray Islands.

The Murray Islands is a group of three islands located 4 miles within the barrier reef, and about 19 miles SSW of Don Cay.

Maer Island (9˚55'S., 144˚03'E.), the northernmost of the group, is the largest and rises to a conical hill, 209m high, on its SW side. The N and E sides of the island are fronted by reefs between 0.5 and 0.7 mile wide. Detached below-water patches and reefs lie W of the island.

Range beacons, in line bearing 145˚, are situated on the NW side of the island. There is a mission and refuge station situated on the island.

Dowar Islet, 184m high, lies 1.5 miles SSW of Maer Island; Wyer Islet lies 1.5 miles S of the same island. The islands are conspicuous.

When entering Flinders Entrance care must be taken in rounding the spit of foul ground extending N from the S entrance point, which is usually marked by tide rips. After rounding the spit, steer S and bring the summit of Maer Island to bear 223˚, avoiding the shoal patch near the middle of the channel.

Close N of Maer Island, the tidal currents set E and W, and attain a rate of 2 knots at springs.

Anchorage.—Anchorage may be obtained, in 46m, sand and shells, 1.5 miles N of Maer Island.

East Cay (9˚24'S., 144˚13'E.) and Anchor Cay, 3.5 miles WNW, lie at the N extremity of the Great Barrier Reef. They are separated from the detached reefs N of Don Cay by deep channels 7 to 8.5 miles wide. A 3.7m shoal lies in the channel, 6 miles S of East Cay. There is a shoal, with a depth of 9.1m, 9.5 miles SE of East Cay and a 7.7m patch lies 4 miles ENE of the cay. A shoal depth of 9m was reported 2 miles E of the SE extremity of the cay.

Ashmore Reef—Portlock Reefs—Eastern Fields

8.87 Ashmore Reef (10˚15'S., 144˚25'E.), with its SW extremity located 21 miles E of Yule Entrance, is the farthest S of a chain of reefs which lies nearly parallel with the Great Barrier Reef and extends about 65 miles NNE. A clear channel between 21 and 28 miles wide lies between this chain of reefs and the outer edge of the barrier reef.

Ashmore Reef, an extensive reef which dries, extends 24 miles NNE from its S extremity.

Boot Reef, a drying reef, lies with its S extremity 10 miles E of the N extremity of Ashmore Reef. It extends 8 miles N. A drying reef about 0.7 mile wide lies 3 miles S of the S extremity of Boot Reef. A shoal, with a least depth of 2.4m, lies 5.2 miles S of the same point; in 1989, it was reported that a steep 5m swell ran over this shoal, although the sea at the time was generally calm.

Pandora Passage is a deep clear opening, 13 miles wide between Boot Reef and the S end of Portlock Reefs.

Portlock Reefs (9˚35'S., 144˚50'E.) form the N part of the chain of reefs extending NNE from Ashmore Reef. Portlock Reefs extend 18 miles N from the N side of Pandora Passage to Lagoon Reef. The sea breaks over all the reefs. The S reef in the group dries and a reef lying 2 miles E of it also dries. De-

tached reefs lie 4.5 miles W of the N extremity of Portlock Reefs.

Lagoon Reef, which dries, lies off the N end of Portlock Reefs, with a below-water rocky bottom between them. In 1980, there was a stranded wreck on the reef which was radar conspicuous.

Eastern Fields (10˚07'S., 145˚40'E.) is in extensive reef enclosing a lagoon. The reef lies about 100 miles E of Yule Entrance in the Great Barrier Reef.

Eastern Fields lies in the S approach to the Great Northeast Channel and has an approximate diameter of 15 miles. All sides of the roughly square-shaped reef are composed of drying or below-water reefs.

A drying reef lies 4 miles WNW of the NW extremity of the reef. Below-water reefs, largely unexamined, lie within 3 miles W and SW, and 1.5 miles SSE, respectively, of the drying reef. A drying reef lies 3 miles S of the S extremity of Eastern Fields. Other dangers are charted in the vicinity.

Adolphus Channel

8.88 Adolphus Channel (10˚40'S., 142˚35'E.) is the principal passage from the Inner Route to Torres Strait, where it joins Great North East Channel from the E and Prince of Wales Channel from the W. The channel is free from dangers within a distance of 0.7 mile on either side of the recommended track. Quetta Rock, and a dangerous wreck and a below-water rock, 0.5 and 1 mile NW, respectively, of Quetta Rock, all lie within 0.7 mile of the track.

Tides—Currents.—In Adolphus Channel, the flood current sets NW and the ebb current sets SE; both attain a rate of 2 to 4 knots at springs. Strong SE winds will increase the strength and duration of the NW current and decrease the strength and duration of SE current.

There are tide rips and eddies in many places in the channel when the currents are at their strength, giving the appearance of foul ground. There is a heavy confused sea off Albany Rock, when the currents are running strongly.

The W current, setting toward Mount Adolphus Island from seaward, meeting the NW current through Adolphus Channel, causes heavy overfalls off the shoals and salient points. The currents attain a considerable rate among the island groups at springs.

8.89 Southwest side.—Albany Rock (10˚43'S., 142˚38'E.), 0.8 mile NE of Albany Island, is 26m high and shows a light. Mai Islet, 48m high, lies close SW of Albany Rock; Pitt Rock lies close SW of Mai Islet. These three islets are connected by foul ground and are closely fringed with reefs that extend nearly 0.1 mile from them.

Foul ground, with a least depth of 7m, lies 0.4 mile to 1.2 miles SSE of Albany Rock.

A 6.1 to 11m shoal, with heavy tide rips over it, extends about 1 mile NW from a position 0.3 mile N of Albany Rock.

Brush Islet, 21m high, lies 2 miles WNW of the light on Albany Rock. Tree Islet lies 0.1 mile N and Sana Rock, with a depth of 0.9m, lies 0.3 mile NNE, respectively, from Brush Islet. A shore bank, with a least depth of 0.3m, extends 0.4 mile E from Tree Islet. Heavy tide rips occur in the vicinity of Sana Rock.

8.90 Northeast side.—Middle Brother (10˚43'S., 142˚41'E.), 5.7m high, lies on the NW end of a drying reef, which is always visible. South Brother, a rock which dries 2.4m, lies on the SE side of the same reef.

A narrow steep-to shoal, with a depth of 5.7m on its S extremity, extends 1.5 miles S from South Brother. The Inner Route lies 0.6 mile SW of the above depth.

North Brother, 12m high, is a detached steep-to rock that lies 0.8 mile NW of Middle Brother. Although the rock is visible at a distance of 6 to 8 miles, it is not always conspicuous.

The Mount Adolphus Islands are a group of high rugged islands, partially covered with stunted trees and scrub, which extend from Pinnacle Peak, 3 miles NNW of North Brother, to Little Adolphus Island, 3.5 miles NNW.

Mount Adolphus Island (10˚38'S., 142˚39'E.), the largest and farthest SE of the group, rises to a height of 150m at flat-topped Mount Adolphus.

Blackwood Bay indents the W side of Mount Adolphus Island; there are depths of 5.5 to 9.1m in the central part of the bay. Blackwood Bank, with a least depth of 2.1m, extends about 1.5 miles NW across the entrance of the bay from a position 0.3 mile NW of the S entrance point. The entrance channels at each end have depths of 7.3 to 10.9m.

Anchorage.—Good anchorage can be taken in the central part of Blackwood Bay, in 7.3 to 9.1m, mud.

Little Adolphus Island (10˚36'S., 142˚37'E.), 1.2 miles NW of the N extremity of Mount Adolphus Island, is the farthest N of the island group. A shore bank, with depths of less than 10.9m, extends about 1.2 miles SW from the island.

Anchorage.—Anchorage may be taken between the above-mentioned bank and Lacey Island, which lies 0.2 mile S of Little Adolphus Island, in 9.1 to 10.9m, about 0.3 mile off Lacey Island.

Bungaree Shoals, three patches with depths of 9.1, 5.5, and 9.4m, lie 3.5 miles NNW, and 3.5 and 4.2 miles N, respectively, of Little Adolphus Island. These small patches are steep-to.

There are other islands and rocks in the Mount Adolphus Islands, which may best be seen on the chart.

8.91 Dangers in Adolphus Channel and the N approach.—Quetta Rock (10˚40'S., 142˚38'E.), a small dangerous patch with a depth of 3.2m, lies 1.2 miles SW of the S extremity of Mount Adolphus Island. It is marked by tide rips; tide rips also occur across the Inner Route between 0.7 and 1.5 miles S of Quetta Rock.

A dangerous wreck lies 0.4 mile NNW of Quetta Rock. A below-water rock, with a depth of 7.2m, lies 1 mile NNW of Quetta Rock.

Mid Rock (10˚41'S., 142˚36'E.), a shoal patch with a least depth of 1.8m, lies on the W side of the Inner Route, 2 miles WSW of Quetta Rock. Its position is usually marked by heavy tide rips.

Alpha Rock (10˚37'S., 142˚31'E.), 18.3m high, lies 4.5 miles N of Cape York. It may be passed at a distance of 0.5 mile on either side and is a good mark when approaching Adolphus Channel.

Vessels proceeding through Adolphus Channel should follow the recommended track.